ATTACHMENT 2

SUMMARY OF CONTRACT FILES REVIEWED

1. Atmospheric Relief Valves - 92697

This contract file was on microfilm in the Knoxville QEB office. The file appeared to be completed, but the radiographic test (RT) reader sheets were illegible. A hard copy of this file had been sent to SQN CONST in two parts on August 16, 1977 and October 18, 1977. The CONST file for this contract had been microfilmed by MEDS. The microfilm had been sent back to SQN CONST and transferred to NUC PR.

The NUC PR microfilm of this contract file included a copy of the contract, various correspondence, QEB and MIG inspection and testing reports; but no test data or information on the RT film was available. In a hard copy file at NUC PR copies of Cope and Vulcan procedures and RT procedures with the shot locations were found, but still no RT reader sheets were available.

2. Auxiliary Control Air Dryers - 83630-1

This contract file was on microfilm in the Knoxville QEB office. The file appeared to be complete. All information in the file was in chronological order with the latest document first. A hard copy of this file was sent to SQN CONST on August 16, 1977. After the NSRS review at SQN, CONST personnel found the hard copy sent by QEB. It was in storage in filing cabinets in another building. The CONST file for this contract had been microfilmed and the film transferred to NUC PR in the same manner as the previous file.

The NUC PR microfilm did not contain manufacturer's specifications, data packages, or certificates of compliance. This microfilmed copy was in a more orderly format than the QEB microfilm. That is, a copy of the contract was first and information was gathered into groups of common types. In the SQN NUC PR hard copy file were data packages but not certificates of compliance. The vendor-related QA data was incomplete at SQN NUC PR.

3. Auxiliary Control Air Dryers, Dewpoint Alarm - 83630-2

This contract file was on microfilm in the Knoxville QEB office. The file appeared to be complete. A hard copy of this file was sent to SQN CONST on August 16, 1977. The CONST file for this contract had been microfilmed and the film transferred to NUC PR in the same manner as the previous files.

The NUC PR microfilm contained a copy of the contract and the QEB inspection reports but did not contain the certificates of compliance or test data packages.

4. Vertical Turbine Pumping Units - 92609

This contract file was on microfilm in the Knoxville QEB office. The information was in two different locations on the microfilm and divided by another contract. The image numbers given for the contract were incorrect. The reel numbers had been changed in ink, and the wrong reel was given to the reviewers initially. The file was not formated in an orderly manner. There was a large amount of test data, certificates of compliance, and miscellaneous information available, but the method in which the contract was set up made it impossible for the reviewers to determine its completeness in a reasonable length of time. A hard copy of the file was sent to SQN in two parts on August 16, 1977 and October 18, 1977. The CONST file for this contract had been microfilmed and the film transferred to NUC PR in the same manner as the previous files.

The NUC PR microfilm contained no test data packages. It did contain the usual information such as MIG receiving reports and several copies of the contract. The file was in a less orderly format than other files reviewed at NUC PR.

5. Steam Generator Safety Valves - 92696

Part of this contract file was on microfilm at QEB in Knoxville and part was in hard copy. The microfilm section included a copy of the contract and changes to it and a few types of required data and certifications. The hard copy, which was in the Records Unit files being prepared for microfilming, contained data packages for all 40 valves. The combined contract file appeared complete. The hard copy of what QEB had microfilmed had been sent to SQN CONST in two parts on August 16, 1977 and October 18, 1977. The CONST files had been microfilmed and the film transferred to NUC PR in the same manner as the previous files.

The NUC PR microfilm contained a copy of the contract, QEB inspection and testing reports, some correspondence, but no data packages. The SQN NUC PR hard copy file contained manufacturer's procedures, a copy of the contract, and test results for 6 valves (34 were missing). No reference was found at NUC PR in the contract files concerning the location of the RT film or the reader sheets.

6. Ice Condenser Seals - 82064

This contract file was in hard copy form in the Knoxville QEB office. It was well organized with an index in the front of the file. There was also a matrix form checklist with data requirements versus data received for each component in the contract. This file had not been sent to the QEB Records Unit for microfilming preparation. Also, there was no record of it having been sent to SQN CONST. The CONST file for this contract had been microfilmed and the film transferred to NUC PR in the same manner as the previous files.

The NUC PR microfilm was poorly organized, but it did appear complete. It had more data than the QEB file.

There were test data sheets and certificates of compliance available which QEB did not have.

7. Ice Condenser Hinge Blocks - 823844

This contract file was in hard copy form in the Knoxville QEB office. It was a small contract, and it appeared to be complete. This file had not been sent to QEB Records Unit for microfilming preparation. There was no record of it having been sent to SQN CONST. The CONST file for this contract had been microfilmed and the film transferred to NUC PR in the same manner as the previous files.

The NUC PR microfilm appeared to be complete.

8. Aluminum and Stainless Steel, Honeycombed Cushions - 82034

Part of this contract file was on microfilm at QEB in Knoxville and part was in hard copy The microfilm portion contained, among other things, a copy of the contract, specifications for the items, certificates of compliance, and shipping memorandums. The hard copy portion of the contract file contained test data reports for all cushions. There was no transmittal of the contract file to CONST or to MEDS. The CONST file for this contract had been microfilmed and the film transferred to NUC PR in the same manner as the previous files.

The NUC PR microfilm contained a copy of the contract and changes to it, receiving reports, and certificates of compliance for eight cushions. There were 24 aluminum and 96 stainless steel cushions bought on this contract, so there should have been 120 certificates of compliance.

9. Missile Doors for Air Conditioning Enclosures - 87226

This contract file was on microfilm in the Knoxville QEB office. The file contained a copy of the contract and the usual correspondence. There was no test data and no mill certifications. There was no record of shipping the contract file to SQN CONST. The CONST file for this contract had been microfilmed and the film transferred to NUC PR in the same manner as the previous files.

The NUC PR microfilm contained a copy of the contract correspondence and inspection and testing reports, but no vendor test data or mill certifications.

10. Reactor Supports - 75018

Part of this contract file was on microfilm at QEB in Knoxville and part was in hard copy. The microfilm portion of the contract contained a copy of the contract, correspondence, and some manufacturer's information. The hard copy file, which was in the QEB Records Unit files, contained data for all components in separate data packages. The combined contract file appeared complete. The NSRS was told that the contract file had been sent to SQN CONST in the 1979-80 time

period and returned at a later date, but there was no record of this transmittal. The CONST file for this contract had been microfilmed and transferred to NUC PR in the same manner as the previous files.

The NUC PR microfilm contained a copy of the contract, correspondence, and shipping and receiving records. There were no test data packages, no mill test reports, and no information on the RT film or reader sheets.

11. Spare Diesel Generator and Exciter, Voltage Regulator - 825204

This contract file was in hard copy form at QEB Knoxville. The file contained a copy of the contract and correspondence. There was no test data. There was also no record of the file being sent to SQN CONST or to MEDS for microfilming. The CONST file for the contract had been microfilmed and the film transferred to NUC PR in the same manner as the previous files.

The NUC PR microfilm contained a copy of the contract and changes to it. There was more correspondence at SQN than at QEB. There were also receiving reports but no test data or certificates of compliance. Some installation instructions were included. In the SQN hard copy controlled manuals was a copy of the seismic analysis and the procedures for performing it. This was also present in the SQN hard copy contract file (considered to be duplicates). The controlled copy came from the NUC PR Central Office in Chattanooga; the origin of the other copy was not known.

12. Level Switches - 83530-1

This contract file was in hard copy in the Knoxville QEB office. Pressure tests were available. A document in the file verified that test data was on file at the vendor's plant. Certificates of compliance were accepted. A materials test file was noted as being on file in Knoxville, but the reviewers could not locate it. No test data was available in the contract file. Since the Chicago Regional Office has been closed, their contract files had been sent from that office to Knoxville. The reviewers looked at the Chicago file for this contract, which was located in a different area than other QEB files, and large numbers of test data were found, much more than could be located in the normal Knoxville file. The regional office file appeared to be more complete than the Knoxville office file, although it was less organized. There was no record of the QEB contract file being shipped to SQN CONST or to MEDS for microfilming. The CONST file for this contract had been microfilmed and the film transferred to NUC PR in the same manner as the previous files.

The NUC PR microfilm contained several copies of the contract, correspondence, certificates of inspection, information sheets, test data for hydrostatic tests, and certificates of compliance. The test data sheets were not complete. The NUC PR hard copy (considered duplicates) contained seismic certification, test data sheets, and engineering reports. The switches had originally been all listed as

requiring QA; but since many of the switches were in systems which did not require QA, memorandums had been written deleting some requirements for non-QA switches.

13. 6900-Volt Switchgear and Transformers - 54495

This contract file was in hard copy in QEB Knoxville. The file was in the QEB Records Unit files and there was no record of it being transmitted to MEDS for microfilming or SQN CONST. The file was well organized and appeared complete. A copy of the contract was included along with data packages, test reports, and certificates of compliance. Seismic certification was available, but that test data was not in the file. The CONST file for this contract had been microfilmed and the film transferred to NUC PR in the same manner as the previous files.

The NUC PR microfilm contained much duplication. Copies of the contract were included, both blank and complete. Seismic certification and shortage reports were included, but there were no test reports. The NUC PR hard copy file contained the seismic test report and analysis but did not contain the test reports found at QEB.

14. 480-Volt Switchgear and Transformers - 54523

This contract file was in hard copy in the Knoxville QEB Records Unit files. This file was neat and well organized. A note was in the file stating that test data was with the technical engineer. Otherwise, the file appeared complete. Information was contained in the contract file that, after acceptance onsite, about every type of weld defect possible was found. These were corrected by the vendor. The completed contract had not been filmed or sent to SQN CONST. The CONST file for this contract had been microfilmed and the film sent to NUC PR in the same manner as the previous files.

The NUC PR microfilm contained a copy of the contract and changes to it, receiving reports, certificates of compliance, and correspondence. There were no test data packages. The NUC PR hard copy file contained certificates of compliance for seismic analyses, transformer tests, equipment manuals, and apparently complete test data.

15. Accumulators, Pumps, CVCS - 826301

This contract file was in hard copy at the Knoxville QEB office. No test data was available in the Knoxville file; it was all still in the Los Angeles Regional Office. The Los Angeles office had its files marked as completed on May 7, 1981. The CONST file for this contract had been microfilmed and the film transferred to NUC PR in the same manner as the previous files.

The NUC PR microfilm file had a copy of the contract and three copies of appendices A, B, and C. It also had four document packages. A note was present stating that the RT file had been returned to SQN NUC PR, but the location of that film could not be determined.

16. **Bellefonte Containment - 85617-1**

This contract file was reviewed to determine the means of retrieving data from a completed file. It was in hard copy form and had only recently been reviewed and sent to the QEB Records Unit. The reviewers asked to see information on a piece of a polar crane bracket, 3-56 M1-1, PA 3-55-5. The information was found in about three hours and with a telephone conversation between the QEB Knoxville materials engineer (section supervisor) and the inspector in the field office to determine the vendor's method of cross-referencing. The person indexing the file also helped in locating the requested document. The Weldments Unit Supervisor indicated a need to add additional intelligence to the file for ease of information retrieval.

TENNESSEE VALLEY AUTHORITY

NUCLEAR SAFETY REVIEW STAFF

SPECIAL PROGRAM MANAGEMENT REVIEW

NSRS REPORT NO. R-83-18-NPS

SUBJECT: SPECIAL REVIEW OF THE OFFICE OF POWER HEALTH PHYSICS PROGRAM AND RESPECTIVE OFFICE OF QUALITY ASSURANCE ACTIVITIES

DATES OF REVIEW: JULY 14-15, 1983 - OFFICE OF QUALITY ASSURANCE
AUGUST 1-26, 1983 - OFFICE OF POWER
AUGUST 29, 1983 - DIVISION OF PERSONNEL
DECEMBER 6-14, 1983 - OFFICE OF POWER

TEAM LEADER: Richard D. Smith — RICHARD D. SMITH — DATE 1/18/84

REVIEWER: Gerald G. Brantley — GERALD G. BRANTLEY — DATE 1/18/84

APPROVED BY: Richard D. Smith — RICHARD D. SMITH — DATE 1/18/84

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I. PURPOSE

The purpose of this review was to determine the results of the reorganization of the health physics functions of the Offices of Health and Safety (H&S) and Management Services (OMS) into the Offices of Power (POWER) and Quality Assurance (OQA).

II. SCOPE

The review consisted of an assessment of programmatic issues, placement of health physics functions within the various TVA organizations, and an evaluation of the effectiveness of program implementation. It involved the evaluation of available documents (bulletins, codes, memoranda, procedures, functional statements, etc.) both finalized and in draft and interviews with personnel in affected organizations.

III. MANAGEMENT SUMMARY

In two reorganizational moves, one in June 1982 and the other in February 1983, the Office of Health and Safety was abolished and the duties and responsibilities of the Radiological Hygiene Branch (RHB) and Laboratory Services Branch (LSB) of that office were incorporated for the most part into POWER. The audit responsibility of RHB was given to OQA. Portions of the duties and responsibilities of RHB were assumed by the Division of Nuclear Power (NUC PR) and the remaining RHB duties and responsibilities and those of LSB were combined within the newly created Radiological Health Staff (RHS). RHS was a part of the Office of Management Services (OMS) from June 1982 until February 1983, when it was transferred to POWER under the Deputy Manager of Power.

As this was a major reorganization affecting TVA nuclear safety activities, the Nuclear Safety Review Staff (NSRS) decided in June 1982 to perform a broad review of TVA's radiation protection and emergency planning programs and the impact of the reorganization on the programs. After allowing sufficient time for the effective transfer of responsibilities and the development of the programs, NSRS performed the review in July and August 1983 and conducted a pre-report follow-up on December 6-14, 1983.

The reorganization was not well planned and managed. No formal master plan or central figure was evident that clearly defined program responsibilities and schedule for the transition. It was initiated based upon the recommendations of a task force which itself had not reached full agreement on the final assignment of some responsibilities (development of TVA policy for radiation protection; program evaluations; dosimetry services; and purchase, calibration, and maintenance of portable health physics instrumentation). A TVA Announcement was issued describing the reorganization only in broad terms. With the reorganization, existing TVA Organization Bulletins, Codes, Instructions, and program documents became outdated and had not been completely replaced with approved documents accurately defining the programs at the time of this review. The transfer of RHS from OMS to

POWER was informally initiated and no program charter was ever issued. With the lack of clear definition of program responsibilities uncertainties were created in both NUC PR and RHS as to what organization would have the final responsibility for the areas in dispute. RHS management understood that they were to be responsible for the "remaining" functions from the old RHB organization and had prepared proposed organization bulletins and codes to that effect. However, as these documents were never approved, doubts began to develop on the part of the RHS personnel as to whether or not RHS would survive the reorganization. These uncertainties fostered disagreements between NUC PR and RHS upper management, created communication and interface barriers between the two groups, hampered staffing, and decreased efficiency in RHS. The result was a disorganized TVA radiation protection program with TVA's technical expertise in one organization and TVA's operational expertise in another organization, neither group willing to fully cooperate and the plants left without the support they needed. A successful program required both types of expertise working together.

The reorganization was to accomplish five goals. These goals are listed and discussed below:

A. Provide closer coordination of inplant health physics with plant activities.

NSRS determined that the organizational change had facilitated coordination of inplant health physics with plant activities. There was described an increase in morale of the plant health physics personnel and a feeling among those interviewed that now the inplant health physics organization was part of the team. The plant health physics staffs now had better control over their budgets and were not caught in the middle (from a budget standpoint) between two organizations (RHB and NUC PR).

Prior to the June 1982 reorganization, the inplant health physics staffs functionally reported to the Plant Superintendent and administratively reported to RHB giving them significant operational independence which corresponded to NRC's recommended organizational structure. After the reorganization the health physics organization was reporting to the Assistant Plant Superintendent for maintenance with no apparent conflicts. That organizational structure was in disagreement with NRC's Regulatory Guide (RG) 8.8 and NUREG-0731. These specify that the health physics organization should be independent from operational and maintenance organizations.

B. Improve utilization of personnel.

The reorganization did not improve the utilization of personnel. NUC PR perceived that this had been achieved since they were using the inplant staffs in a more efficient manner without interference from any outside organization. However, RHS was

being under-utilized and efforts of both Nuclear Power Central Office (NCO) and RHS personnel directed toward the organizational conflicts were nonproductive.

The plant staffs were operationally oriented and primarily staffed with personnel who had progressed up through the technician training program. The plant health physics supervisor historically provided the inplant health physics technical guidance, but over the years had directed more attention to administrative duties and more reliance on technical assistance from RHB (now RHS). As the plant health physics staff no longer reported to RHS, the reorganization hampered that assistance. There was a definite need for more technical-level health physics support at the plants to properly identify and address the increasing number of potentially serious health physics problems that will likely eventually manifest themselves due to plant aging, increasing nuclear fuel failures, and extensive outage activities.

It is recognized that each plant cannot staff with sufficient expertise to handle all problems, and a centrally located technical staff will always be required to avoid duplication of effort and to some extent expertise. TVA has that expertise within the current RHS organization, but they were being under-utilized. This is not meant to downgrade the current effort to resolve the NUC PR identified problems, but it is believed that for certain types of problems, such as the trans-uranium activity found at BFN, RHS personnel should be assigned to the plant until the problem is sufficiently quantified and the protection and monitoring programs developed to the point where plant personnel are capable of taking over. This concept can and should be extended to routinely assigning RHS personnel to the plants to work for the plant health physics supervisor on special projects. This would not only help the plant but would increase the operating experience of RHS personnel. NSRS understands discussions between RHS and NUC PR are underway in this area and encourages their success.

Care must be exercised when increasing the NCO staff in Health Physics Operations Support Section (HPOS) to prevent duplication of effort. It would be in TVA's and NUC PR's best interest to utilize the RHS staff expertise to the extent possible before adding new positions for the sole purpose of providing technical support.

C. Establish clearcut management accountability for radiological protection.

It was determined that the establishment of clearcut management accountability for radiological protection had not been achieved. Existing documents defining responsibilities in the areas of health physics and emergency preparedness were unclear, confusing, inconsistent, or nonexistant. All personnel interviewed

understood that each plant superintendent was accountable for their specific health physics and emergency planning programs. However, the operational support roles were not clearly defined. The responsibility for managing the radiation protection program was assigned to a "branch" level organization in NUC PR with five other programs to manage. It was further delegated to a section that was not properly staffed to provide formal program definition and support to the plants.

D. Eliminate duplication of training capabilities.

As RHB, prior to the reorganizations, was the only organization teaching health physics, and since that responsibility had been assumed as a result of the reorganizations in total by NUC PR Nuclear Training Branch , there did not appear to be any duplication to eliminate. Nevertheless, the transfer appeared to go smoothly. Although the training program had not been formally issued, it was in the approval stages with a goal of obtaining INPO accreditation. Problems had been encountered in the past with significant turnover of health physics technicians at the plants and their ability to maintain a sufficient number of replacements. To satisfy their needs for the long term, NUC PR had reduced the basic phase of the training program from six months to four months and had lowered the educational and experience entrance requirements. It was too early to assess if, indeed, TVA will be better off with the new concept.

E. Improve coordination of emergency planning.

No identifiable change either positive or negative was found in the coordination of emergency planning. The emergency preparedness program appeared to be functioning but existed primarily within the minds of a few individuals and was not properly documented. It was believed by NSRS that additional staff was required in the NCO's Radiological Emergency Preparedness Section to facilitate program documentation, maintenance, and implementation.

At the time of this review OQAB did not have sufficient staff to perform the required audits of TVA radiation protection and emergency planning programs and had borrowed personnel from RHS. The presence of the RHS members on the audit teams further divided RHS and NUC PR as the NUC PR personnel felt that RHS harboured a "vendetta" against them and were unduly harsh in the audits.

OQAB was in the process of obtaining additional personnel with health physics experience for permanent positions on their staff. Personnel from both NUC PR and RHS were interviewed and offered these positions. However, none accepted and OQAB is still understaffed in health physics.

Several OQAB audit reports in the area of health physics and emergency planning were reviewed by NSRS and were determined to be thorough, programmatic, and of good quality.

While the reorganization is potentially beneficial in a long run, it was poorly managed which created unnecessary disputes and in some areas a year of wasted effort. In August 1983 it appeared to NSRS that the hurt feelings, uncertainties, and disagreements were beginning to be resolved. In December 1983 NSRS found that the functional areas in dispute had been resolved by NUC PR and RHS and/or the Deputy Manager of Power. With that resolution, personnel in both NUC PR and RHS were able to describe a much closer working relationship and sense of unity toward accomplishing goals. Continued effort and participation by all levels of POWER management will be required until programs are well defined and functioning.

IV. CONCLUSIONS AND RECOMMENDATIONS

A. R-83-18-NPS-01, Management of the Reorganization of the TVA Radiation Protection and Radiological Emergency Planning Program

Conclusion: The responsibilities for conducting TVA's radiation protection and radiological protection program were not well defined and disagreements as to the final disposition of some of the functions had not been resolved. TVA Organization Bulletins, Codes, and Instructions had not been issued a year after the reorganization and this had led to interface and communications barriers between NUC PR and RHS. (See section V.A, D, and E for details).

Recommendation: Upper management in POWER should take actions to assure that the final decision is promptly made regarding the assignment of responsibilities and that all necessary TVA corporate documents (codes, bulletins, instructions) are updated to reflect the final decisions. POWER upper-management involvement should be maintained until the program has been implemented in accordance with the approved documentation.

B. R-83-18-NPS-02, NUC PR Program and Licensing Documents

Conclusion: The NUC PR program and licensing documents for radiation protection and radiological emergency planning were being worked on but had not been issued or were out-of-date. These documents include Area Plan Program Manuals, OQAM, BFN and SQN Technical Specifications and FSARs, and plant standard practices. (See section V.C.1 for details.)

Recommendation: Resources should be directed toward preparation, updating, and issuing area plan manuals, OQAMs, SQN and BFN technical specifications and FSARs, and plant standard practices.

C. R-83-18-NPS-03, Organizational Emphasis of NUC PR Radiation Protection and Radiological Emergency Preparedness Programs

Conclusion: The radiation protection and emergency preparedness programs had been organizationally deemphasized within NUC PR (reduced from a branch level in H&S to a section level within

NUC PR). This was further emphasized by the November 29, 1983 request to amend the BFN Technical Specifications which show health physics among other service groups reporting to no specific management position. NCO staffing of the two sections responsible for those two functional areas appeared to be inadequate to properly develop and maintain needed programs. (See section V.C.2.a and d.)

Recommendation: NUC PR should place more organizational emphasis on these programs and should increase the staff size of the emergency preparedness and health physics operations support sections to the level and with the technical expertise necessary to develop and maintain their respective programs.

D. R-83-18-NPS-04, Organizational Placement of Health Physics at Nuclear Plants

Conclusion: Despite the lack of a documented reporting chain for the inplant Health Physics Section, the reporting chain was described as being to the Assistant Superintendant for Maintenance which was not in compliance with NRC RG 8.8 and NUREG-0731. While no indication of a comflict of interest was observed or reported, the potential for a conflict of interest was being fostered by the organizational structure. (See section V.C.2.b)

Recommendation: NUC PR should change and formalize the reporting chain of the inplant Health Physics Section to the Plant Superintendent thereby eliminating the requirement to report to either the Assistant Superintendent of Maintenance or Assistant Superintendent for Operations and Engineering. Reestablishment of the third Assistant Superintendent for Health and Safety Services with the health physics supervisor reporting to that position would also be acceptable.

E. R-83-18-NPS-05, Health Physics Technical Staff Onsite

Conclusion: The Health Physics Section at SQN, consisting primarily of personnel with health physics backgrounds, does not have sufficient technical expertise in health physics to identify unique and new health physics problems as they occur. On the other hand, BFN is in better shape with an individual with a technical health physics background serving, in an unapproved position, as Assistant to the Health Physics Supervisor, Technical Services. This person had been instrumental in providing technical support to the plant by identifying problem areas requiring further technical analysis by offsite personnel and providing on-the-spot technical guidance. [See section V.C.2.b.(2).]

Recommendation: Establish in the Health Physics Section at each plant the position of Assistant to the Health Physics Supervisor, Technical Services, or similar, and staff that position with highly qualified, degreed health physicists.

F. R-83-18-NPS-06, RHS Technical Support

Conclusion: RHS is not providing the technical support or long-range planning support to the plant commensurate with their abilities. RHS personnel are spending too much time in the office and not enough time in the field where the problems are. (See section V.E.4.)

Recommendation: NUC PR and RHS should establish a mechanism to provide more presence of RHS personnel in the operating plants possibly on some rotational schedule whereby RHS technical level personnel can work on plant technical problems for the plants at the plants on a full-time basis.

G. Functionability of Current Organizational Structure

Conclusion: The current organizational structure with the separation of operating and technical expertise can work. To do so will require a cooperative effort from all personnel within NUC PR and RHS. Any further organizational changes at this time, other than as described in recommendations R-83-18-NPS-03, -04, and -05 are discouraged as potentially counterproductive.

V. DETAILS

A. Management of the Reorganization

During the early part of 1982 TVA top management made a decision to reorganize the Office of Health and Safety. As a part of this overall effort a task force was formed to determine how best to assign the health physics, emergency planning, and laboratory services functions between POWER and the Division of Occupational Health and Safety (OC H&S) without duplication of effort. The task force was comprised of representatives from the OMS, OC H&S, and NUC PR. Based upon the task force work, the General Manager issued a TVA Announcement dated June 1, 1982, which specified that OC H&S was dissolved; health physics personnel at the nuclear plants were transferred to POWER; about 11 OC H&S employees would be offered positions at the Power Operations Training Center (POTC); and the remaining radiological functions of OC H&S, including the Laboratory Services Branch, would be the responsibility of the newly created Radiological Health Staff reporting to the Manager of Management Services. This announcement was not as specific as the task force recommendation in that it did not address the transfer of the emergency planning function and associated positions to POWER, and it only implied, through the statement that 11 OC H&S people would be offered positions at the POTC, that the responsibility for health physics training was transferred to POWER. In actuality, the 11 positions included both training and emergency planning.

The more detailed reorganization plan of the task force was transmitted, for General Manager (GM) approval, in a memorandum

from the Manager, OMS, to the GM on June 7, 1982, and was approved by the GM on June 8, 1982. The reorganization memorandum approved by the GM abolished OC H&S and transferred the operational aspects of the emergency planning and radiological hygiene program from RHB to NUC PR. These operational aspects include the inplant health physics staff which was to report to the Assistant Superintendent (Health and Safety Services), health physics training, and emergency planning. It also created the Radiological Health Staff (RHS) reporting to the Manager, OMS, to recognize the ". . .importance of corporate program definition, oversite, and performance evaluation . . . ."

Concurrent with the GM's approval of the reorganization on June 8, 1982, the Organization Bulletin I POWER Nuclear Power was approved. This bulletin accurately reflected the new responsibilities of NUC PR in the areas of health physics, emergency planning, and training. No organizational bulletin was issued for RHS.

On November 18, 1982, Administrative Release Memorandum No. AR-229 was issued and directed that Section I of the Management Services Health and Safety Organizational Bulletin, pages 1-3, dated July 18, 1980, be removed and destroyed. This section contained the responsibilities of RHB and Laboratory Services Branch (LSB). AR-229 also contained the note "The Organizational Bulletin under I Management Services Radiological Health Staff will be issued later." An organizational bulletin of RHS was never issued.

On February 6, 1983, OMS was abolished and RHS transferred to POWER. There was no official paperwork prepared for this transfer; it was described by personnel in the Organization and Management Planning Branch (OMPB) as being accomplished over the telephone. RHS was not organizationally placed within POWER until March 18, 1983, when the Deputy Director of POWER, by memorandum, informed the Chief of RHS that RHS would remain in Muscle Shoals and report directly to the Deputy Director of POWER. The memorandum further stated that ". . . the division of responsibility and lines of communication between the RHS and the Division of Nuclear Power must be worked out and agreed upon as soon as possible." There was no timeframe depicting how long "as soon as possible" should take, and at the time of this review areas of disagreement still existed.

When the June 1982 reorganization occurred, changes to the Organization Bulletin were submitted to the GM who approved the change for NUC PR but not RHS. Numerous reasons were offered by POWER and the Division of Personnel (PERS) regarding why the bulletin had not since been issued. When the Organizational Bulletin was revised in November 1982 for OMS, RHS was omitted. Reasons stated by OMPB for the omission were the impending abolishment of OMS, which occurred on February 1, 1983, and

resultant transfer of RHS to POWER, coupled with the desire not to change the bulletin more often than necessary. Once transferred to POWER, other organizational and functional changes within POWER required changes to the bulletin, in addition to the inclusion of RHS, which held up the issuance.

Since the original proposed change, the bulletin for RHS has been in the revision process to arrive at a version acceptable to all affected groups. The above changes resulted in the expressed feeling by members of RHS that they lacked identity, definite responsibilities, and did not know from one day to the next where or if there would be an RHS.

In a discussion with personnel in the OMPB, it was pointed out that their responsibility regarding bulletin and code changes were limited to recording organizational changes and assuring there was no duplication of responsibility. The responsibility for preparing changes to bulletins and codes rested with the affected organizations.

Absence of an Organization Bulletin should not, according to OMPB, have an adverse affect upon RHS because the philosophy was unless the bulletin specifically changes a given responsibility, the affected group continued to perform the functions as before because nothing had changed. On the surface this philosophy makes good sense, but the bulletins are generally written in broad terms leaving specific responsibilities subject to interpretation and negotiation, and the old bulletin for H&S which would have governed RHS' duties had been cancelled. Therefore, RHS had no bulletin to govern its operations. Herein lies a problem with the reorganization.

Organizational changes recommended by the task force and approved by the GM did not provide sufficient details to clearly designate responsibilities and resolve conflicts or unresolved issues. Instead unresolved issues were left open by the task force for later resolution. These functional changes included at the onset were radiation dosimetry and portable radiation instrument calibration and maintenance and later included program evaluation. These will be discussed in more detail in section V.E of this report. In the absence of specific upper management guidance in these areas, RHS and NUC PR essentially agreed to disagree from the onset on the resolution of these problems. Communication problems between NUC PR and RHS developed as well as morale problems within RHS. With the transfer of RHS to POWER and the directive to NUC PR and RHS from POWER management to define their respective areas of responsibility as soon as possible, the problem was not solved and may have, in fact, intensified.

On a more positive note, in the middle of August the Deputy Manager of Power had a meeting with RHS personnel which appeared to place some of their fears to rest. In a pre-report follow-up in December 1983 NSRS learned that the functional disputes over

dosimetry, evaluations, policy interpretations, and technical assistance had been resolved and assigned to RHS by the Deputy Manager of Power. Discussions with NUC PR and RHS personnel indicated that communications and working relations between the two organizations had vastly improved and they were working together.

B. RHS Responsibilities, Organization, and Staffing

At the time of the NSRS review there was no official TVA Organizational Bulletin or Code that acknowledged RHS' existence or their function. Consequently, the June 28, 1983 proposed bulletin and the RHS functional statements in existence at the time of the review and used by RHS were used by NSRS to identify RHS' responsibilities and organization to implement those responsibilities. Under the Director of RHS, the staff is divided into two groups, Health Physics Services and Laboratory Services, and the Policy and Evaluation Section which reports directly to the Director, RHS.

1. Policy and Evaluation Section

a. Policy Unit

According to the proposed bulletins, RHS "plans, develops, and interprets policy for radiation protection and control programs for TVA activities . . . ." Functionally, this had been assigned to the Policy Unit consisting of two professional level individuals. Implementation of that responsibility had been accomplished through the preparation of Radiological Protection Plans (RPP) for POWER (approved August 8, 1983), Office of Natural Resources (approved April 25, 1983), Office of Engineering Design and Construction (approved May 2, 1983), Office Agricultural and Chemical Development (approved May 2, 1983), and the Division of Medical Services (approved April 26, 1983). Continued work in this area should be minimal and consist primarily of maintaining awareness of pending changes in regulatory requirements, consensus standards, industry practices, and updating the RPPs as regulatory or TVA changes occur.

b. Evaluation Unit

The proposed bulletin assigned an evaluation role to RHS to be implemented through the Evaluation Unit. This staff, consisting of four professional people, was still attempting to define their method of fulfilling this function. Effort in this role has been hampered by the fact that these individuals were essentially on assignment to OQAB for the last year to provide the technical expertise in health physics lacking in OQAB.

In NSRS' opinion this section should perform a technical evaluation of a program that goes beyond requirements and includes such things as efficiency, state of the art, etc. The evaluation should identify problems or potential problems along with recommended solutions. The recommended solutions should be worked out with plant and NCO input for feasibility and implementability.

2. Health Physics Services

a. Technical Assistance Section (TAS)

The proposed bulletin assigned RHS responsibility to review ALARA design changes as provided by Engineering Design, perform environmental radiological assessments, develop specifications for purchase of new portable radiation monitoring equipment, and provide health physics services. These functions were to be carried out within this section. With regard to the development of specifications for portable radiation monitoring equipment, the TAS supervisor chairs the Health Physics Instrument Committee which has RHS and NUC PR representation. This committee prepares purchase specifications, evaluates bids, prepares calibration criteria, and resolves generic instrument problems.

(1) Assessment Unit

Consisting of nine professional positions, the Assessment Unit performed environmental assessments for all TVA operations (nuclear power, uranium mining and milling, etc.) and technical support including ALARA design changes as needed to all users within TVA of radiation or radiation producing devices.

(2) Health Physics Support Unit

The Health Physics Support Unit, with two professional and three technician positions, provided the basic health physics program support for all TVA operations except NUC PR. Those included all byproduct and special nuclear material licensed activities of which, at the time of this review, there were approximately 30. In addition, there were approximately 10 radiation producing devices (x-ray), which do not require licenses, surveyed by this unit.

b. Dosimetry Section

The draft bulletin assigns to RHS the responsibility to define, develop, and provide radiation dosimetry services and assessment of personnel exposures. Fulfillment of this responsibility has been functionally assigned to the Dosimetry Section which contains five professional positions, five technician positions, and five clerical positions. This staff processes approximately 2000 SQN, 3000 BFN, 200 non-NUC PR whole body TLD badges each month. In addition, it processes an average of 200 TLDs each month for environmental monitoring around all TVA nuclear operations. It provided about 600 extremity monitoring TLD badges per month to NUC PR. This section processed all those badges with the exception of the extremity badges and those relatively few whole body badges processed at SQN during the month, and it documented the results of all processed TLDs. Each TLD badge is calibrated by this section on an annual basis.

As a result of the multiple badging problem at BFN this section had to go on shiftwork to provide the needed service. The number of badges processed increased for BFN from an average of about 3,000 per month to 17,000 for the month of October, which consisted mostly of special pulls. For the most part turnaround time was 12 hours or less and NUC PR was extremely pleased with this support.

Not specifically assigned in the bulletin are the services provided in support of the internal exposure whole body counting (WBC) program. This unit specifies the type of equipment to be used at each of the nuclear plants and provides the computer software, calibration, and operational support for their operation. Data developed, on an individual basis, was evaluated by this unit and the associated records were maintained.

3. Laboratory Services

a. Western Area Radiological Laboratory

The bulletin assigns the responsibility of providing laboratory services for environmental monitoring in support of work place monitoring. These functions were carried out by Laboratory Services within RHS. Laboratory Services had two area laboratories, the Eastern Area Radiological Laboratory (EARL) in Vonore, Tennessee, and the Western Area Radiological Laboratory (WARL) in Muscle Shoals, Alabama. Effective September 1, 1983, EARL was closed as a cost savings action. As the two laboratories were built to support TVA's large

nuclear power commitment, which has been reduced, all the support required for the current nuclear program should be able to be provided by WARL. Most of their work has been with environmental samples, but recently they have been analyzing workplace samples from BFN for transuranium isotopes. There has been no change in this program as a result of the reorganization.

b. Calibration and Quality Control

The bulletin assigns the responsibility to RHS for maintaining portable radiation monitoring equipment. This has been assigned to the Laboratory Services Calibration and Quality Control Unit. With three professional positions and five technicians, this unit repairs and calibrates all the portable radiation monitoring equipment. There has been no change in this function as a result of the reorganization.

C. NUC PR Responsibilities, Organization, and Staffing

The organization changes of June 1, 1982, transferred the following operational aspects of TVA's radiation protection program from the Office of Health and Safety to NUC PR:

- Inplant health physics services
- Health physics training
- Coordination and implementation of radiological emergency planning

The responsibilities and organizations for executing the NUC PR health physics and emergency preparedness programs are delineated in Corporate, POWER, and NUC PR documents. The following is a discussion of the status of that documentation and NUC PR's respective organization for implementation.

1. Defined Responsibilities and Programs

a. TVA Organization Bulletin, "Division of Nuclear Power," dated June 8, 1982

This document is the highest tier corporate document defining NUC PR's responsibilities in the health physics and emergency preparedness areas and reflects the reorganization. It assigns responsibilities to the following organizations within NUC PR:

- The Manager, Technical Support, is responsible for the development and maintenance of written programs and provides direct technical support to the nuclear plants in the areas of health physics and emergency preparedness.

- The Emergency Preparedness and Protection Branch (EP&P), through the Health Physics Operations Support Section, develops and maintains programs for radiation protection and provides direct support for the health physics operational activities.

- The Radiological Emergency Preparedness Section of the EP&P Branch develops and coordinates the implementation of the TVA REP.

- The Nuclear Training Branch under the Manager, Technical Support, administers the health physics technician training program through its Radiochemistry and Health Physics Section.

- The Manager, Nuclear Production, is responsible for assuring that radiation protection programs are implemented in TVA nuclear plants.

- Each power plant superintendent is responsible for radiation control at his facility. The plant requests central staff assistance on emergency matters and keeps the central staff informed of operating and maintenance problems.

b. TVA Code VIII, "Occupational Radiation Protection," dated October 16, 1980

This document states TVA's policy for providing a workplace environment in which individuals are protected from hazards from exposure to ionizing radiation and for maintaining occupational radiation exposures as low as reasonably achievable (ALARA). This document was outdated and did not re·lect the reorganization.

c. TVA Code XI, "Radiological Emergency Planning," dated May 2, 1980

This document states TVA's policy for protecting the health and safety of the public and employees from ionizing radiation at TVA facilities and for the development of radiological emergency plans (REP) to ensure adequate protection. This document was outdated and did not reflect the reorganization.

d. POWER Radiation Protection Plan (RPP), dated August 29, 1983

This document was prepared by the RHS in POWER and defines TVA's program for radiation protection and reflects the reorganization.

e. NUC PR's Directives Manual dated May 26, 1983

This document establishes an "Area Plan" concept which groups together elements having common or closely related functions and objectives into division programs. Each program area has a NCO manager who is responsible for program development, procedure approval, management of projects, and monitoring of program effectiveness and efficiency.

For each program, there is an approved charter which defines the program scope, manager's responsibilities, manual content in terms of program elements, major source documents, interfaces, and broad performance measurement criteria. Each charter forms the basis for the manager's development of his particular program manual (Area Plan) and governs all of his activities in its use. Because of the newness of this Area Plan concept, the three program manuals reviewed (Radiation Protection Manual, Emergency Preparedness Manual, Nuclear Training Program Manual) were generally incomplete and the majority of the planned contents had not been issued.

f. NUC PR Operational Quality Assurance Manual, Part II, Section 1.3, "Radiological Health Protection," revised October 9, 1980

This document was out-of-date and did not reflect the reorganization.

g. BFN and SQN Technical Specifications

Section 6 of the Technical Specifications for both plants were out-of-date and did not reflect the current TVA/POWER/NUC PR/Plant organizations responsible for radiation protection.

h. BFN and SQN FSARS

Section 13 and sections 12 and 13 of the BFN and SQN FSARs, respectively, describe the plant health physics program, organization, and responsibilities. Both FSARs were outdated and did not reflect the reorganization. Both FSARs showed the existence of a third Assistant Plant Superintendent in charge of health and safety services through which the Health Physics Supervisor reported to the Plant Superintendent. This position had been eliminated and the health physics supervisors at both plants reported to the Assistant Plant Superintendent in charge of maintenance.

i. BNF and SQN Standard Practices

Plant specific responsibilities for radiological protection were specified in both BFN and SQN standard practices. For BFN Standard Practice BF5.1, Health Physics Program," and for SQN Standard Practice SQA116, "Radiation Safety Responsibilities and Relationships - All Nuclear Plants," were out-of-date as they referenced documents that were outof-date or cancelled (N-OQAM Part II, Section 1.3, and DPM N80A16) and did not define the Assistant Plant Superintendent's (Maintenance) responsibilities for the plant health physics program.

Plant specific responsibilities for emergency preparedness were specified in BFN Standard Practice BF22.1, "Radiological Emergency Plan" and SQN Standard Practice SQA123, "Revisions to the Sequoyah Nuclear Plant Radiological Emergency Plan (SQN-REP) and Site Implementing Procedures Document (SQN-IPD)." These did not reflect the reorganization.

Generally, the NUC PR program documents are either out-of-date or nonexistent. Resources should be made available to generate, update, and issue the documents.

2. NUC PR Organization and Staffing for Radiation Protection, Health Physics Training, and Emergency Preparedness

a. Nuclear Central Office (NCO) Radiation Protection Organization

Responsibilities for the radiation protection program were assigned to the Emergency Preparedness and Protection Branch Chief who had responsibilities for five other programs (emergency preparedness, nuclear plant security, industrial safety, environmental protection, and fire protection). The branch chief could reportedly spend only approximately 10 percent of his time on radiation protection matters. Prior to the reorganization, radiation protection responsibilities had been assigned to a branch-level organization, under an M-7 devoting 100 percent of his time to radiation protection and emergency preparedness, and supported by a large technical staff. In the NUC PR organization, health physics and emergency preparedness personnel devoting 100 percent to these programs occurs at the M-5 section level with insufficient technical staff.

Initially, NUC PR was not organized or staffed in the NCO to implement their newly acquired function of providing direct technical support and program direction

to the nuclear plants in the area of radiation protection. A management-level health physics supervisor was transferred from SQN to the NCO five months after the first reorganization and assigned as the section supervisor of the Health Physics Operations Support Section (HPOS) of EP&P. Several chemical engineers at the SC-level with minimal health physics backgrounds who had previously been assigned to the HPOS section from other organizations in NUC PR remained to assist the supervisor in establishing the NUC PR health physics program. Vacancy notices were posted by NUC PR to fill positions in both the HPOS and Emergency Preparedness Section (EPS), but little or no qualified interest was shown within TVA and the vacancies remained. Additionally, RHS viewed these notices as an attempt by NUC PR to duplicate the RHS staff. Subsequently, in July 1983, one individual with significant experience in the area of radiation dosimetry was hired from outside TVA as a staff health physicist to administer the development and implementation of NUC PR's Radiation Exposure Management Section which at the time of this review had not been formally established. Another technical individual with significant experience in applied health physics was hired from RHS in August 1983 as a staff health physicist to assist with the NUC PR efforts for operational program development and support. Two health physicists at the SC-level had also been added.

NUC PR management stated that the present NCO organization must continue to expand in order to help establish, maintain, and support the NUC PR radiation protection and emergency planning programs, but that staffing has been hampered by the uncertainties of placement of certain responsibilities created by the reorganization. The branch chief and section supervisors were actively negotiating with upper-division management for restructuring of the present organization for one which would increase the size of the staff to about 12 and provide more "inhouse" health physics technical expertise.

During the December pre-report follow-up it was learned that the uncertainties associated with certain responsibilities had been removed by the Deputy Manager of Power, but at the time of this review NUC PR was still not organized or staffed in the NCO to implement their acquired responsibilities.

b. <u>Inplant Health Physics Services</u>

(1) Reporting Chain

Prior to the reorganization the inplant health physics group functionally reported to the plant superintendent but reported administratively to RHB. Program support and direction was provided by RHB. Documentation initiating the reorganization indicated that the inplant health physics organization would report to an assistant plant superintendent responsible for health and safety services. This position, however, had been eliminated by NUC PR management because it supported the opinion of the plant assistant superintendents for operations, engineering and maintenance that the third assistant was an "inferior position" and that it did not have the same level of responsibility and headaches as those assistants in charge of operations, engineering and maintenance.

At the time of the review, the health physics supervisors at both plants reported to the Assistant Plant Superintendent in charge of maintenance. NSRS discussed the radiation protection programs with these assistant plant superintendents and it appeared that neither had a good background in health physics or were directly involved in the program. Both expressed full support for the radiation protection program and did not view their responsibilities for maintenance activities as being a potential conflict of interest. All health physics personnel interviewed reported that management at the plants fully support the radiation protection program and that they were now viewed as part of the team rather than an outside group with an adversary role. The health physics supervisors were not aware of any identified conflicts of interest.

NSRS views the organization of the health physics function at the plants as lacking sufficient independence from line activities. On the one hand, the Assistant Superintendent is in charge of maintenance and repair, which are generally critical path activities affecting generation availability. On the other hand he is in charge of health physics which by necessity may complicate the maintenance and repair process and result in delays in operations. To maintain his "team player" image, the Health Physics Supervisor may, without realization, lose his objectivity and yield to subtle inherent pressures of supporting the maintenance and repair schedule. NSRS is not of the opinion that this would be a deliberate

action with the present personalities involved but one that could slowly evolve over a period of time without being recognized by the participants. However, if personalities in the management positions were to change or someone was placed in Assistant Superintendent (Maintenance) or Health Physics Supervisor positions who did not fully appreciate unique radiation protection problems, the progam could degrade rapidly.

The NRC in RG 8.8 and NUREG-0731 state respectively:

> The Radiation Protection Manager (RPM) onsite has a safety function and responsibility to both employees and management that can be best filled if the individual is independent of station divisions, such as operations, maintenance, or technical support, whose prime responsibility is continuity or improvement of station operability. The RPM should have direct recourse to responsible management personnel in order to resolve questions related to the conduct of the radiation protection program.

and

> The reporting of the functional areas of radiation protection, quality assurance, and training should assure independence from operating pressures. In utilities with large commitments to nuclear power plants, overall management and technical direction in these areas may well be concentrated at the home office.

NSRS agrees with the NRC position. The radiation protection responsibilities should be recognized by NUC PR as being at least on an equal basis as operation, engineering, and maintenance by restoring the third Assistant Superintendent (Health and Safety Services) or have the Health Physics Supervisor report to the Plant Superintendent. In either case, the plant health physicist should have established formal offsite lines of communication to NUC PR division management and the appropriate authorities to communicate concerns without fear of retribution.

(2) Health Physics Staff

At SQN the health physics management expertise was in the operational health physics technician area with upper supervision rising from the technician level. The staff was lacking sufficient technical talent to identify and address unique problems as they occur. In addition, SQN had no health physics technicians with longevity (more than four years).

At BFN their technical complement was better with a person with a master's degree in nuclear engineering and a strong health physics background and two with bachelor of science degrees in physics with experience in operational health physics mostly at the technician level.

Historically, the supervisor of health physics was the technical expert onsite. Both the nature of the health physics problems and the workload allowed the supervisor to both direct the group and provide technical advice. However, over a period of time, the number of administrative duties have increased and additional responsibilities have been assigned to the health physics onsite group. The nature of the health physics problems at the site have also resulted in additional technical problems.

Historically, both BFN and SQN have operated without a significant number of defects in the fuel which helped minimize exposure to radiation and contamination. During the last operating cycle of unit 1 at BFN, an unusual amount of fuel cladding failed resulting in a significant increase in radiation and contamination levels in the plant (a similar condition now exists with unit 3.) As a result of this failed fuel, some unique health physics technical problems were encountered when the unit 1 outage began (presence of trans-uranium isotopes, ability or inability of the whole body counting equipment to measure isotopes previously not considered to be a problem, multiple badging, etc.). Those unique technical problems had to be adequately addressed to ensure the safety of BFN personnel. At that time there was insufficient technical staff at BFN to address the new problems. Futher hampering the resolution of those problems was the fact that the interface and communication process with the group in TVA having the technical staff (RHS), who provided direct support to the plants prior to the

reorganization, was somewhat impeded by a less than desirable working relationship between NUC PR and RHS.

In order to overcome some of these problems at BFN, a technical level position was added to the staff at BFN. A significant number of additional technical issues were identified that needed to be resolved, but the health physics personnel were overwhelmed with the amount of work that needed to be performed. Realizing this in June 1983, the plant staff formally requested assistance in resolving 19 technical issues relating to radiation protection. The request was forwarded from the plant to NUC PR's central office then on to RHS in Muscle Shoals. At the time of the review, RHS and NUC PR were working together to resolve these issues.

The technical position at BFN (Assistant to the Health Physics Supervisor, Technical Services) had not been approved as permanent at the time of this review. In addition to supervising the training, mask fitting, and whole body counting activities, this position provided technical support to the rest of the section. NSRS highly endorses the new technical position and recommends that it be made permanent and filled with a degreed health physicist. SQN did not have a similar position and NSRS recommends that one be established and filled in a like manner.

c. NCO Health Physics Technician Training

After the organization change of June 1, 1982, NUC PR assumed the responsibility for administering a health physics training course already in progress at Muscle Shoals. This course was successfully completed and the training function then transferred to NUC PR's POTC.

The health physics organizations in the plants have had difficulty in retaining qualified technicians. The primary reason seems to be that the job market for contract technicians has been attractive and offers excellent monetary benefits. TVA was employing 72 contract health physics technicians at BFN and 35 at SQN to satisfy their outage needs. To combat the attrition and provide more stability in the technician ranks, NUC PR has lowered the educational and experience-level requirements to allow hiring high school graduate-level personnel. Previously, the requirements were two years of college in a technical area to gain entrance into the training program.

It is planned to employ people from the local areas around the plants hoping that their "roots" will keep them on the job. These personnel will be hired at the SE-2 scientific-aide level and given some academic and on-the-job training at the plantsite. Those that perform satisfactorily will be considered as candidates for the health physics training program.

NUC PR evaluated the health physics technician training program and eliminated some portions that were considered unnecessary considering the new practice of selecting class candidates from the plants. The eliminated portions (plant tours, first aid, industrial safety, guest lectures) were in the basic phase of the training program taught at POTC. The basic phase has essentially been reduced from six to four months. NUC PR intends to also continue to hire experienced personnel with two years of college technical education whenever they can be obtained and their training will be lengthened 224 hours for plant specific training that was removed from the training schedule of the SE-2s coming from the plants. POTC is working with the plants and plans to incorporate operational feedback into the programs to eventually tailor a training program that will be of most benefit to TVA.

The transfer of responsibilities for health physics training appeared to have been accomplished in an orderly fashion. In addition, the staff at POTC appeared appropriate to the tasks and dedicated to providing a quality product. One of the goals was to obtain INPO accreditation for the training program.

d. NCO Radiological Emergency Preparedness

The emergency planning coordination effort in NUC PR was the responsibility of the Emergency Preparedness and Protection Branch Chief. This responsibility has been further delegated to the Radiological Emergency Preparedness Section Supervisor. The Radiological Emergency Prepardeness Section received five positions from RHB as a result of the reorganization. Personnel filling these positions received directed transfers and, all but one at the SB level accepted the transfer and moved to Chattanooga. Prior to the reorganization, RHB had 11 people and one vacancy in emergency planning developing the RHB and coordinating the development of TVA programs. At the time of this review, NUC PR had only 8 people developing both NUC PR's and coordinating the development of TVA's programs.

The program was functioning, primarily due to the dedicated effort (a lot of overtime) of those persons in

the Radiological Emergency Preparedness Section, but needs clear and formal program documentation as the procedures for the NUC PR Emergency Preparedness Manual have not been issued.

D. Interface and Communications Between NUC PR and RHS

The manner in which the organization changes of June 1, 1982, and February 6, 1983, occurred (lack of complete preplanning and clear definition of program responsibilities) created an environment that promoted the growth of interface and communication barriers between the health physics and emergency preparedness organizations in NUC PR and RHS. Upper level managers from both organizations fairly well understood what their responsibilities were but remained unsure of where areas in dispute would finally end up. This fostered disagreements between NUC PR and RHS resulting, in some cases, in a year of wasted effort. During the review there were indications that communications were improving and the two organizations were beginning to work together. In December 1983 the functional disputes had been resolved, and personnel from both organizations expressed the belief that a vast improvement in working relations had occurred.

E. Functional Areas With Organizational Disagreement

A number of disagreements occurred during the reorganization of the health physics function, all in areas where RHS and NUC PR must interact. Many of the disagreements could be traced to interpretation of functions assigned in the official documents associated with the reorganization and the lack of an official Organization Bulletin for RHS and the absence of a decision at the office level on who would do what. With no official detailed charter for RHS, it appeared, and was perceived by RHS, that NUC PR was trying to take or deemphasize RHS functions and OQAB was trying to hire away RHS personnel. In the TVA Announcement of June 1, 1982, it was stated that the health physics people at the plants were transferred to POWER. In the organizational change memorandum of June 7, 1982, from Bonine to Willis and approved by the GM, it stated "The operational aspects of the radiological hygiene program including inplant health physics services . . ." were transferred to NUC PR. This later document appeared to transfer more of RHB's responsibilities to NUC PR than the first and is the source of much of the conflict between NUC PR and RHS. NUC PR management expressed the opinion that if they are responsible for health physics at the plants, they should have the associated programs. The resultant areas of conflicts are described as follows:

1. Policy

RHS, in the draft bulletin and code for RHS dated July 5, 1983, plans, develops, and interprets health physics policy

for TVA. This is consistent with the organization change memorandum of June 7, 1982, which recognized the importance of corporate program direction. Within NUC PR this RHS responsibility was not recognized. The NUC PR area plan for radiation protection did not reference RHS' policy document, the RPP, as a source document. Throughout NUC PR the Division Director was viewed as the source of all policy determinations. The RPP was viewed by NUC PR, with the exception of the TVA 4 rem/y whole body dose limit, as a compilation of existing NRC regulations and, therefore, unnecessary. On September 30, 1983, the Deputy Manager of Power assigned this responsibility to RHS.

2. Evaluation

Using the same reference document as in section E.1 above, RHS was responsible for evaluating TVA's health physics program from a technical standpoint. NUC PR views RHS evaluations as another audit and unnecessary. Reviewing the history behind evaluations, NSRS found that NUC PR denied RHS access to SQN for the purpose of performing an ALARA evaluation in July 1982. RHS had planned on performing ALARA evaluations at BFN, SQN, and NCO and had completed the evaluation at BFN when access to SQN was denied. Subsequently, in order to perform its evaluation function, RHS gained access to the plants by assisting the Operations Quality Assurance Branch (OQAB) with their audits. Evaluation reports were prepared by RHS based upon information obtained during the audits. Discussion with NUC PR indicated that, in retrospect, they should not have denied access to RHS; conversely, RHS stated that they had not tried to gain access on their own since that time. Reviewing all RHS evaluation reports prepared at the time of this review, it is NSRS' opinion that they are audit reports and not evaluations.

Discussion with RHS management indicated that evaluation to them meant reviewing programs for technical adequacy, not compliance with requirements. Recommendations would be made to correct problems identified in the evaluation reviews. RHS assistance to NUC PR to correct identified problems would be by request only. Others in RHS believed they should provide assistance to the plants in the form of recommended solutions to problems identified. In either event, it appeared obvious to NSRS that RHS had not solidified its evaluation role.

Within NUC PR's area plan for radiation protection the area plan manager is required to provide evaluation reports to the Director. Within NUC PR there is some disagreement between methods of accomplishment. Upper management believes evaluations are made continuously based upon available information and not NCO evaluation reviews at the

plants. Below the Director level, however, inplant evaluation reviews by NCO was seen as part of their evaluation role. Throughout NCO it was clearly pointed out that they would be responsible for working with the plants to solve plant problems, including those found during evaluations. NUC PR did not want RHS solving inplant problems. Plans were described by NUC PR to increase the NCO Health Physics Staff to accomplish this role.

Inplant health physics personnel expressed another point of view in that they would welcome RHS assistance but did not want RHS assisting with problem solution if RHS would turn around and use plant-identified problems against them in an evaluation report.

It is apparent that the evaluation function remains unclear, but both organizations currently plan to evaluate the health physics program. The TVA nuclear power program would receive a terrible disservice if the majority of TVA health physics technical expertise were used only to find problems and not fix them as well. To be effective and for the good of TVA, the evaluation function must include problem solution as well. The audit of the programs will be conducted by NRC, INPO, NSRS, and OQA.

On September 30, 1983, the Deputy Manager of Power decided that RHS would perform evaluations, and RHS's first evaluation since that decision was being finalized in December 1983.

3. Dosimetry

This area has probably been the source of more conflicts than any other. Basically, NUC PR wanted whole body radiation exposure dosimetry to be performed inplant by NUC PR with real time dosimetry results (dosimeter results immediately fed to an online computer). RHS wanted to retain the current central dosimetry processing concept. This issue was discussed at length by the reorganization task force and they did not reach an agreement. Therefore, the task force recommendation for reorganization contained a hidden functional dispute because dosimetry was not addressed in any of the official documents of the reorganization.

Reviewing documentation on dosimetry revealed a series of proposals, counterproposals, agreements, and renigging by both RHS and NUC PR. At the time of the reorganization, RHS contained all of TVA's expertise in dosimetry which included about 16 people located in Muscle Shoals, Alabama, and Vonore, Tennessee. NUC PR wanted to eliminate those positions and establish positions at each of the plants.

Since that time, the M-5 in charge of dosimetry for RHS (probably one of the leading dosimetrists in the country) has transferred to NUC PR via CP&L. Consequently, both RHS and NUC PR were independently preparing proposals for TVA's dosimetry program and each expending effort discrediting the others proposals. In NSRS' opinion merit exists within both positions and a combination would probably be most appropriate from both technical and economic standpoints. The duplication of effort and apparent inflexibility by both NUC PR and RHS was counter productive and not in TVA's best interest.

On October 18, 1983 NUC PR and RHS reached a compromise position and presented it to the Deputy Manager of Power, who approved the proposal. Basically, special dosimetry pulls would be processed at the plants with a direct link to TVA's computerized record system. The computerized record system, normal monthly dosimetry processing and maintenance and calibration of dosimetry equipment would be RHS's responsibilities.

4. Souce of Technical Expertise and Support

NUC PR's technical expertise is discussed in section IV.C of this report.

Within the RHS organization resided approximately 2 PhDs, 9 MS, and 10 BS degreed people with majors in health physics or some related field. While heavy in academics, this group was weak in operational experience. At the time of this review RHS was not providing sufficient technical support to the plants. There was no aggressive effort identified within RHS to perform long-range health physics planning for known or suspected problems. RHS technical support provided to NUC PR at their request was being provided for the most part from the office. Certain problems, specifically the BFN transuranimum problem quanitification, should involve considerable onsite time by RHS personnel and this was not occuring.

Clearly, the operational expertise resided with NUC PR and the technical expterise with RHS. An effective health physics program requires both types. After the reorganization BFN continued to obtain technical assistance directly from RHS until it was directed to obtain those services through NCO. The inplant programs cannot be expected to function properly without good technical support indefinitely because SQN and BFN are either beginning to or will begin to develop new health physics problems associated with age. The inplant health physics staffs do not have the necessary resources or technical ability to effectively deal with these plus current problems. This is not to imply that they should; historically and more efficiently, the required

assistance has been and should be obtained from a highly technical central office staff. The location of that staff organizationally or geographically is irrelevant if people can communicate and interface effectively. What is relevant is that the staff provide the necessary support for all of TVA's programs including nuclear power. It is important to realize that while NUC PR requires the largest amount of health physics activities, TVA has approximately 30 NRC licenses for activities not associated with NUC PR. These activities are quite different from NUC PR activities (uranium mining and milling, fertilizer development, etc.) and present a different set of problems. Radiation producing devices and phosphate slag problems also require health physics activities.

On September 30, 1983 the Deputy Manager of Power decided that RHS would provide technical support in health physics to NUC PR.

5. Instrumentation

This function was another area in the reorganization that was the source of considerable discussion by the task force and placed on the shelf for further discussion. Since that time NSRS could not find any further discussion between NUC PR and RHS on that subject. RHS has continued to provide the purchase, maintenance, and calibration functions. Concern was expressed by both NCO and SQN regarding the closure of the EARL. The NUC PR concern was over whether or not Laboratory Services in the WARL could provide the same level of "excellent" support supplied by EARL. RHS assured NUC PR that WARL could provide the support to SQN it needed.

F. Office of Power Nuclear Safety Review Board Involvement in the Transfer of Radiological Protection Responsibilities from the Office of Health and Safety to the Office of Power

One purpose of the NSRB, as stated in its charter, is to advise the Manager of Power of the nuclear safety significance of TVA activities and on the adequacy and implementation of TVA nuclear safety policies and programs. In addition, technical specifications for BFN and SQN specify that the respective NSRB shall function to provide independent review and audit in the area of radiological safety. The audit function is performed by the OQAB and the audit reports are reviewed by the NSRB.

NSRS interviewed members of POWER's Nuclear Safety Staff who are also members of the BFN and SQN NSRBs. The purpose of the interviews were to determine the NSRB involvement in the transition of radiological safety responsibilities from the Office of Health and Safety to POWER. Additionally, NSRS was interested in the NSRB members opinion pertaining to the quality of the audits being performed by OQAB in the area of radiological safety.

NSRB personnel interviewed stated that they had not specifically followed the transfer of responsibilities and functions from the Office of Health and Safety to NUC PR. They felt the transition was more administrative and would not directly affect nuclear safety. They were aware that the TVA Organizational Bulletins and Codes were out-of-date and that problems had developed in the transition due to disagreements between NUC PR and RHS upper management. They had, however, elected not to become involved as more pressing issues required their attention.

The NSRB members interviewed were satisfied with the quality of the OQAB audits in the area of radiological safety.

G. Office of Quality Assurance Activities in the Area of Health Physics

NSRS interviewed members of the Quality Improvement Staff (QIS), Systems Engineering Branch (SEB), and Operations Quality Assurance Branch (OQAB) to assess the level of health physics expertise in their organizations and their respective activities.

QIS had no specific activities scheduled in the area of health physics. SEB was preparing a Management Policy and Requirements Manual which will include procedures under the Operations Section for TVA's health physics program. Neither section (QIS or SEB) had personnel with health physics expertise other than of a general nature gained from NRC inspection experience. Those interviewed were not cognizant of the organization changes and transfer of responsibilities for TVA's radiation program from OC H&S to POWER.

OQAB is charged with the responsibility of auditing POWER's radiation protection programs. OQAB had one individual in its organization with health physics expertise and had borrowed personnel from RHS to assist this individual with audits of NUC PR's program. OQAB was in the process of adding more health physics technical expertise to its staff (approximately six) and was actively interviewing personnel from RHS and NUC PR for these positions. As of December, however, these positions remained unfilled.

The audits that had recently been performed in the area of radiation protection were thorough and meaningful. OQAB was planning to expand its audit function to the balance of TVA's radiation protection program.

VI. PERSONS CONTACTED

A. Office of Power

1. Energy Supply

J. P. Darling, Deputy Manager of Power (Energy Supply)

a. Radiological Health Staff

E. A. Belvin, Director
R. B. Maxwell, Chief, Health Physics Services
J. L. Lobdell, Staff Health Physicist
L. J. Politte, Policy and Evaluation Section Supervisor
R. P. Reed, Policy Unit Health Physicist
J. L. Ingwersen, Technical Assistance Section Supervisor
R. L. Doty, Assessment Unit Supervisor
E. V. Kingery, Health Physics Support Unit Supervisor
S. G. Bugg, Dosimetry Section Supervisor
C. E. Kent, Jr., Evaluation Section Supervisor

b. Nuclear Safety Staff

F. A. Szczepanski, Chief Nuclear Safety Staff
C. E. Chmielewski, Member SQN NSRB
T. M. Galbreth, Member BFN NSRB

c. Divison of Nuclear Power

(1) Nuclear Central Office

H. J. Green, Director of Nuclear Power
R. A. Sessoms, Acting Technical Support Manager
J. W. Hufham, Chief, Emergency Preparedness and Protection Branch
R. J. Kitts, Health Physics Operations Support Section Supervisor
E. K. Sliger, Radiological Emergency Preparedness Section Supervisor
C. G. Hudson, Staff Health Physicist
J. T. Dills, Chemical Engineer (Health Physics)
J. W. Schuessler, Supervisor, Services and Standards Section
C. A. Holt, Supervisor of Manpower, Planning, and Development Section

(2) Power Operations Training Center

R. J. Johnson, Chief, Nuclear Training Branch
L. H. Sain, Assistant Chief, Nuclear Training Branch
N. E. Scott, Radiochemistry and Health Physics Section Supervisor
M. H. Martin, Health Physics Training Coordinator

(3) Sequoyah Nuclear Plant

C. C. Mason, Power Plant Superintendent
J. Krell, Assistant Power Plant Superintendent (Maintenance)
D. Crawley, Health Physics Section Supervisor
S. Holderford, Assistant Plant Health Physicist (Operations)

F. Wright, Assistant to the Plant Health Physicist
J. Leamon, ALARA Engineer

(4) Browns Ferry Nuclear Plant

J. A. Coffey, Acting Power Plant Superintendent
J. R. Pittman, Assistant Power Plant Superintendent (Maintenance)
T. L. Chinn, Plant Compliance Section Supervisor
J. B. Walker, Compliance Engineer
A. W. Sorrell, Health Section Supervisor
J. Cory, Assistant Health Physics Section Supervisor (Technical)
H. M. Crowson, Assistant Health Physics Section Supervisor (Outage)
E. M. Cargill, Assistant Health Physics Section Supervisor (Operations)

B. Office of Quality Assurance

1. Office of Quality Assurance Branch

R. L. Lumpkin, OQAB Branch Chief
R. L. Moore, Support Services Program Group Head
F. B. Smith, Programs Support Group Head
G. W. Killian, Plant Programs Group Head
T. O. Frizzell, Quality Assurance Evaluator

2. Quality Improvement Staff

J. A. McDonald, Quality Improvement Staff Chief

3. Systems Engineering Branch

M. S. Kidd, Program Management Group Head
M. E. Reeves, Quality Assurance Specialist

C. Divison of Personnel

S. E. Wallace, Chief, Organization and Management Planning Branch
E. A. Brown, Administrative Analyst

VII. DOCUMENTS REVIEWED (REFERENCES)

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15. Memorandum to E. A. Belvin from H. J. Green, "Bioassay Technical Support - Browns Ferry Nuclear Plant," April 18, 1983

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I. Division of Nuclear Power (Power Operations Training Center)

1. Training Plan for Health Physics Technicians

2. Retraining Plan for Health Physics Technicians

3. Health Physics Technician Training Program - Instructor Lesson Plans

J. Sequoyah Nuclear Plant

1. Sequoyah Nuclear Plant Technical Specifications, Unit 1

a. Section 3/4.7.10 "Sealed Source Contamination"

b. Section 6.1 "Responsibility"

c. Section 6.3 "Unit Staff Qualifications"

d. Section 6.4 "Training"

e. Section 6.5 "Review and Audit"

f. Section 6.5.3 "Radiological Assessment Review Committee (RARC)"

g. Section 6.8 "Procedures and Programs"

h. Section 6.8.5A "Primary Coolant Sources Outside Containment"

i. Section 6.8.5B "Implant Radiation Monitoring"

j. Section 6.11 "Radiation Protection Program"

k. Section 6.12 "High Radiation Area"

l. Section 6.14 "Offsite Dose Calculation Manual"

2. Final Safety Analysis Report

a. Section 12.3 "Health Physics Program"

b. Section 12.4 "Leakage Reduction Program"

c. Section 13.1 "Organization Structure Applicant"

d. Section 13.1 "Emergency Planning"

e. Section 13.4 "Review and Audit

f. Section 13.5 "Plant Instructions

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   b. Section 6.1 "Organization"

   c. Section 6.2 "Review and Audit"

   d. Section 6.3 "Procedures"

   e. Section 6.6 "STation Operating Records"

   f. Section 6.7 "Reporting Requirements"

   g. Section 6.8 "Minimum Plant Staffing"

   h. Section 6.10 "Integrity of Systems Outside Containment"

   i. Section 6.11 "Iodine Monitoring"

3. BFN Final Safety Analysis Report

   a. Section 13.2.1.2 "Plant Organization"

   b. Section 13.3 "Training Program"

   c. Section 13.6 "Normal Operations"

4. BFN Standard Practices

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TVA 44 (08-0-83)

UNITED STATES GOVERNMENT

R-83-27-NPS-01 OPEN

Memorandum

TENNESSEE VALLEY AUTHORITY

GNS '840203 052

TO : G. H. Kimmons, Manager of Engineering Design and Construction, W12A9 C-K

FROM : H. N. Culver, Director of Nuclear Safety Review Staff, 249A HBB-K

DATE : February 3, 1984

SUBJECT: REVIEW OF THE DIVISION OF CONSTRUCTION QUALITY ASSURANCE/QUALITY CONTROL PROGRAM - NSRS REPORT NO. R-83-27-NPS

During October and November 1983, NSRS performed a review of the CONST Quality Assurance/Quality Control (QA/QC) Program. The review focused on implementation of the program by the BLN and WBN Quality Manager's Organizations (QMO) created in January 1983. Four specific areas were reviewed, including (1) site specific QC organization and program, (2) training and qualification of personnel, (3) corrective action programs, and (4) inspection process. Also, where differences between site's activities were observed, these were evaluated.

The attached report concludes that the CONST QA/QC program implemented by the QMO and the Quality Engineering and Support Staff (QESS) is adequate, but with some weaknesses, and improving. The objective in establishing the QMO of assuring that QC inspectors are sufficiently independent to report quality problems appears to have been achieved. Other desired objectives, such as achieving consistency of program application at and between sites and establishing a verified QA/QC philosophy, have yet to be fully realized. One recommendation concerning improvement in the communication of information and requirements necessary to achieve consistency and enhance efficiency has been made for your consideration of appropriate corrective action. It was determined that problems with effective communication of requirements may have contributed to inefficiency of production as indicated by apparent high reject/failure rates and to an opinion held by some QC supervisors and inspectors that QC was the only group held accountable for knowledge of requirements.

The corrective action response should be submitted for evaluation by April 1, 1984. If you have any questions concerning this memorandum, please contact M. A. Harrison at extension 4816.

H N Culver
H. N. Culver

MAH:LML
Attachment
cc (Attachment):
J. W. Anderson, M155G MIB-K
G. F. Dilworth, E12D46 C-K
H. G. Parris, W5B63 C-K
MEDS, W5B63 C-K

NSRS FILE

P. U.S. Savings Bonds Regularly on the Payroll Savings Plan

GNS '840203 053

TENNESSEE VALLEY AUTHORITY

NUCLEAR SAFETY REVIEW STAFF

REVIEW

NSRS REPORT NO. R-83-27-NPS

SUBJECT: Review of the Division of Construction QA/QC Program

DATE OF REVIEW: October 31 - November 22, 1983

COORDINATOR: M. A. HARRISON — DATE 2-2-84

REVIEWERS: C. M. KEY - BELLEFONTE TEAM LEADER — DATE 2/2/84

J. C. JONES - WATTS BAR TEAM LEADER — DATE 2/2/84

D. L. BAILEY — DATE 2/2/84

APPROVED BY: R. D. SMITH — DATE 2/2/84

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I. BACKGROUND

In response to concerns, both internal and external to TVA regarding the independence and effectiveness of the TVA nuclear construction quality control of inspection functions and in an effort to reduce the span of control of construction engineering, a reorganization to separate the quality control (QC) functions from production support units was accomplished at the Watts Bar Nuclear Plant (WBN) and the Bellefonte Nuclear Plant (BLN). The reorganization removed the QC inspection and related quality assurance (QA) functions (i.e., document control and records, training, procedures, licensing, and response functions) from the construction engineering organization and placed them under a new Quality Manager's Organization (QMO) at each plant. The QMO is under the supervision of the Quality Manager, who reports directly to the Project Manager (PM). The QMO became effective January 23, 1983, and was implemented February 20, 1983. The organizations were similarly staffed and contained management positions at an acceptable level to ensure the integrity of the QA/QC efforts at these plants.

The Director of NSRS in memoranda to the General Manager dated July 19, 1983, and August 9, 1983, committed NSRS to perform a review of quality control activities in the fall of 1983 to assess the practical application of the new QMO's at WBN and BLN. This commitment was made based on concerns about the overall QA/QC program and management controls as expressed by TVA Board comments, the NSRS memoranda noted above, and by NRC inspection report transmittal letters on WBN in June 1983. As a result of these concerns and commitments, a four man review team was assigned. The review commenced on October 31, 1983, and was concluded on November 22, 1983 with an exit with the Manager of Construction.

II. SCOPE

The primary focus of the review was to determine if the creation of the Division of Construction (CONST) QMO with its separation of the quality control function from the production support function had in fact resulted in both improved quality and quality management performance. The review elements involved were: (1) CONST quality organization and programs, (2) Quality Manager's organization and programs, (3) training, qualifications, and certification of personnel, (4) engineering and craft training, (5) corrective action programs, and (6) Inspection implementation. This review did not address the deferred plants or construction service activities at operational plants.

III. MANAGEMENT SUMMARY

The NSRS review of the CONST QA/QC program concentrated on the QMO, QC procedures, and performance of activities at Watts Bar and Bellefonte, and the division-level program requirements. Of the areas reviewed, no new violations of regulatory requirements were

identified. Overall the program and organization were determined to be adequate with some weaknesses, and improving.

The primary purposes for which the QMOs were created, i.e., increasing the organizational independence and status of QC inspectors, reducing the Construction Engineer's span and depth of control to a manageable level, and creating an awareness of QC responsibilities, have been accomplished. Construction engineering and quality personnel were nearly unanimous in their acceptance and appreciation of the reorganization. Other goals expressed by the OEDC Project Managers intended by the reorganization had not been fully achieved, as some program and performance weaknesses were identified. The other stated goals are summarized below:

1. Achieve consistency of implementation

2. Achieve unified QA/QC philosophy

3. Improve training programs

It was noted during the review that some programs required by the CONST QA Program Manual and the CONST QA Training Certification Manual permit wide variation between sites in implementing strategies as described by site-generated QC procedures. As examples: At Watts Bar only, journeyman craftsmen receive scheduled instruction in QC procedures; only Bellefonte performs testing of craft and engineering personnel to determine the effectiveness of their formal QC training; the philosophies of use of the Inspection Rejection Notice, a deficiency-reporting document used at Watts Bar and recently implemented at Bellefonte, differ significantly as do the local practices of determining and reporting a variety of trends.

Variations such as these were considered the result of insufficient upper-tier program guidance necessary for consistency, rather than the result of deliberate management prerogative.

Directly related to the problem of insufficient guidance for implementing TVA requirements was the concern expressed by almost all hanger QC inspectors and their supervision, with interpretation of the drawing notes for typical hangers. Generally the notes were disorganized, referenced each other and unincluded documents, and were subject to extremes in interpretation. For example, at Watts Bar the notes for typical hanger drawing 47A050, number 37 pages with 27 referenced Field Change Requests. The EN DES hanger design and hanger design change processes were not reviewed during this review; however, it did not appear that additional training of QC inspectors on the content of these notes would correct the root cause of this situation.

The problems with program definition and communication described above do not overshadow a significant effort by CONST to improve the quality program. On the division level, the Quality Engineering and Support Staff (QESS) had revised and/or initiated Quality

Assurance Policies (QAPPs) and Quality Assurance Procedures (QAPs) to account for the creation of the QMO and reassignment of responsibilities from QA to the QMO. Quality managers at both sites had initiated and/or issued new or revised procedures implementing the changes in a timely manner. Efforts to resolve INPO and NRC findings were noted to have been initiated at Bellefonte. Additionally, the following summarized points, considered to be strengths, were observed:

1. Improved attitude of QC inspectors as a result of having their "own" managerial organization and clearly-defined roles. No inspector interviewed had any concerns of harassment or interference. QC inspectors observed on the job appeared generally knowledgeable, industrious, and committed to quality performance.

2. Job descriptions and MAS evaluations for Quality Management Personnel indicated a strong emphasis on achievement of quality objectives.

3. CONST Quality Management was aware of upper-tier program weaknesses. Most appeared to be under active consideration of correction although there was concern that OQA's Management Policies and Requirements (MPRs), when issued, would require another series of revisions to divison and site procedures.

4. Specifically, the current welding inspection qualification program in operation at Watts Bar and the Mechanical QC Unit's training program at Bellefonte were determined to be well organized, efficient, and exacting.

5. The cancellation/deferral of other nuclear projects has permitted an experienced QC group to be concentrated at Watts Bar and Bellefonte.

IV. CONCLUSIONS AND RECOMMENDATIONS

As a result of evaluation of the problems and weaknesses of the CONST QA/QC program described in Section VI "Details," it was determined that they all related to weaknesses in communication of requirements and information.

R-83-27-NPS-01 Weaknesses in Communication of Requirements and Information

Conclusion: Although the QA/QC program and QMO were determined to be adequate and improving, weaknesses in communication of requirements and information have delayed achievement of consistently applied programs at each site as well as between sites. Specifically:

1. The QATM did not provide guidance for evaluating the effectiveness of formal training, minimum requirements for determining an employee's readiness and ability to independently perform work (excluding NDE). Site procedures were not definitive in these areas. Additional details are described in section VI.B.2.

2. Division-level requirements for performance of trend analysis and the Inspection/Rejection Notice system were insufficient. Variations in basic philosophy, application, and reporting were observed between sites and among units at sites.

3. Trend analysis or other means of communication had not disclosed a generic problem with inadequate definition of requirements for inspection of typical hangers. Project management at both sites stated they were not fully aware of the magnitude of the problem. Conversely, trend analysis of IRNs at Watts Bar had disclosed a problem with crafts turning in incomplete work for QC inspection, but effective corrective action had not been taken.

Recommendation: Construction management should continue efforts to improve the division-level and site quality programs to achieve the expressed goal of consistency of implementation and uniformity of QA philosophy. Specific program differences and communication weaknesses identified in section VI should be evaluated and modifications made as determined appropriate.

NSRS also concluded that the present QA/QC program and Quality Manager's Organization demonstrated noteworthy strengths in some areas. These are described in the Management Summary and in Section VI, "Details," and are not reiterated here.

V. STATUS OF PREVIOUSLY IDENTIFIED OPEN ITEMS

Two items remaining open from NSRS report R-81-28-WBN were reviewed to verify that corrective action taken had been effective.

A. R-81-28-WBN-14, Inadequate Procedure Review

Responsiblity for conducting site procedure reviews was transferred from the QA Group to the Quality Manager's Organization. A review of selected QCPs and QCIs indicated the procedures were receiving adequate review. This item is closed (for additional details see section VI.A).

B. R-81-28-WBN-20, All Aspects of QA Program Not Audited

From interviews with the CQAB PSS supervisor and a review of OQA Verification Plans, it was determined that sufficient progress has been made on this item to permit closure. (See section VI.A for additional details.)

VI. DETAILS

A. Division of Construction Quality Assurance/Control Program and Organization

The Division of Construction (CONST) QA/QC programs for nuclear plants under construction were prescribed in the CONST Quality Assurance Program Manual (QAPM) and for training and qualification of personnel performing or verifying activities affecting quality in the CONST Quality Assurance Indoctrination Training and Qualification Program Manual (QATM). The policies and procedures of these manuals were intended to specify quality program requirements to be implemented at nuclear projects under a construction permit. They were required to reflect licensing commitments of the Topical Report and OEDC policy as expressed in the Program Requirements Manual (PRM) and the Interdivisional Quality Assurance Procedures Manual (ID-QAM). CONST QAPM and QATM requirements were to be, in turn, implemented at Watts Bar (WBN) and Bellefonte (BLN) Nuclear Plants directly by site-approved quality control procedures and instructions (QCPs and QCIs).

Through the "tiered" arrangement of quality requirements, activities affecting quality performed at the sites should have been in accordance with the licensing requirements of TVA Topical Report TVA-TR-75-1A, Revision 7, as approved by the U.S. Nuclear Regulatory Commission (NRC). NRC comments on and/or approval of the Topical Report, Revision 7, were due on October 12, 1983, but were not received. Due to circumstances beyond TVA control, NRC comments on Revision 7 may not be received until December 1983. In the interim, the Manager of the Office of Quality Asurance (OQA) issued a memorandum to OEDC and POWER Office Managers on October 20, 1983, announcing full implementation of the Topical Report Revision 7 regardless of NRC approval. The memorandum also announced that the organizational transition had been completed.

The organizational transition referred, in part, to the creation of the Quality Manager's Organization (QMO) at BLN and WBN and the CONST Quality Engineering and Support Staff (QESS) at the division level, as well as the quality performing and assuring functions for which they were responsible. The Quality Managers' organizations are described in section VI.B. The Quality Engineering and Support Staff (attachment 1) was primarily reponsible for developing and maintaining the division-level quality policies and procedures (QAPM and QATM), under the supervision of the Assistant Manager of CONST.

NSRS reviewed the CONST Quality program prescribed by the QAPM. It consisted of Quality Assurance Program Policies (QAPPs) and Quality Assurance Procedures (QAPs), approved at the appropriate management levels. The manual was organized to sequentially address each of the 18 criteria of 10CFR50,

Appendix B. Generally, QAPPs required that programs be established and documented in accordance with upper-tier TVA requirements. QAPs were more detailed, providing information and assignment of responsibilities to CONST organizations for assuring that programs were implemented and controlled. It was apparent from this review and from interviews with CONST management that significant effort had been expended to upgrade and strengthen the QAPM and to account for the recent organizational and functional changes.

No major omissions were identified by NSRS in the division-level program, which were not addressed by CONST management. Corrective measures to account for the absence of detailed division-wide requirements for trend analysis of deficiencies and failures, and reporting thereof, were under active consideration by CONST, but a determination on inclusion in division-level procedures had not been made by completion of the NSRS review. CONST management was also aware of the potential for continuing program changes which may be necessary as a result of OQA's forthcoming Management Policies and Requirements (MPRs), which are intended to implement the topical report and are currently in the development and/or conceptual stages. NSRS reviewers noted that both BLN and WBN were using the Inspection/Rejection Notice (IRN) system, prescribed by site procedures, but without benefit of a controlling division-level procedure. The result of this situation, discussed in further detail in section VI.B.3, was a significant degree of inconsistency of philosophy and application in the IRN system between the two sites. Additional differences of implementation of QAPPs and QAPs between sites were apparent and are described in Section VI.B, "Quality Manager's Organization and Program Implementation."

In interviews with site Quality Managers, NSRS heard that, occasionally, division QAPs which require site action are received at the site with insufficient time to establish and implement the required program prior to the effective date of the QAP. This criticisim was considered valid, although not indicative of a general breakdown, since site management was required to review and approve division-level policy and procedures in accordance with QAPP 5 of November 21, 1983, prior to division approval. In an effort to improve communication between projects of potential quality problems, CONST had replaced the information notice system with QAP 16.7, "Quality Bulletins," revision 0 of October 19, 1983. This procedure had been recently implemented and it was too early to determine its effectiveness although it was considered an improvement to the previous system because it required investigation and response by the site into problems identified by the Quality Bulletins. At the time of the review, six Quality Bulletins had been issued, three to each site, with responses due early in December 1983.

From interviews with CONST management in Knoxville and a review of items of correspondence, it was apparent that CONST and OQA have established communication channels at all levels. Meetings have been held to discuss differences of opinion or strategy on such key issues as deviation control and quality records. While not all disagreements are yet resolved, their working relationships appeared to be effective and should facilitate CONST involvement in the development and implementation of MPRs necessary to minimize their potentially disruptive impact.

In an effort to determine that OQA intended to review the status and adequacy of the CONST QA/QC program and activities, NSRS reviewed the three-year, annual, and quarterly verification plans recently issued by Construction Quality Assurance Branch (CQAB) and interviewed the supervisor of the CQAB Planning and Support Services Section. The review was inconclusive because the documented annual and three-year verification plans do not detail the scope and depth of the scheduled verifications, i.e., audits and surveillance. The CQAB quarterly plan is sufficiently detailed to permit assessment of planned coverage, but due to its limited range, does not attempt to assure verification of all aspects of the CONST QA/QC program. The CQAB supervisor interviewed by NSRS was confident that the results-oriented audits and surveillances scheduled would address all aspects of the program and allow an OQA assessment of program adequacy. Since the Verification Plans have been approved and issued, and since audit responsibility has shifted from CONST to OQA for construction quality programs, NSRS determined that corrective action for previously identified item R-81-28-WBN-20, All Aspects of the (CONST) QA Program not Audited was complete to the point that the item is closed.

Quality Program - Quality Manager's Organization

As stated, the sites were required to implement the quality program by the use of site-approved procedures and instructions. The WBN program was delineated in the Quality Control Procedures (QCPs), Quality Control Instructions (QCIs), and Quality Control Test Procedures (QCTs). All engineering and quality control personnel were required to receive training and be qualified in the procedures, instructions, and test procedures applicable to the function(s) in which they are engaged. In addition to the training, quality control personnel (inspectors) were certified by examination to the QCPs and QCTs applicable to the quality activities which they were performing.

The quality program at BLN was contained in the quality control procedures (QCPs) and construction test procedures (CTPs). All engineering and quality control personnel were trained and qualified in the QCPs and CTPs applicable to the functions they perform. Also, quality control personnel (inspectors)

were certified by testing (written and/or oral) to the QCPs and CTPs that pertain to the quality activities that they were performing.

A noted difference between the two programs was that WBN had segregated "administrative procedures" into separate documents that were titled Quality Control Instructions. BLN had procedures that the site viewed as administrative, but they were contained in the Quality Control Procedures. However, BLN like WBN did not require inspectors to be certified to these "administrative procedures." Interviews with site QC personnel revealed the following three concerns related to the quality program.

1. Hanger Inspection Program

Mechanical, electrical, instrumentation, and hanger QC personnel (inspectors) at WBN performed final visual examination of support welds. In addition to this function, they also performed a final support installation inspection. Each unit was responsible for the supports in their respective discipline. With the exception of the Hanger QC Unit, the QC units were inspecting supports in accordance with criteria from typical support drawings (i.e., 47A050-series, 47A053-series, etc.). Additional criteria, exceptions, and references for these typical supports were contained in general notes associated with the drawings. Interviews with WBN QC inspectors revealed that these general notes were a great source of consternation. The notes were described as vague and open to interpretation as illustrated by the lack of agreement between engineering and QC as to the requirements of the notes. Inspectors also stated that the general notes were so ambiguous that any installed support could be accepted by using them. Upon examination by NSRS reviewers of the notes, it was noted that there was a total of 37 pages of general notes for the 47A050 drawing. These notes were unordered and had 27 open Field Change Requests (FCRs) issued for them. From interviews of WBN upper-level management, it appeared to NSRS that they were not fully aware of this problem. Interviews with QC inspectors at BLN revealed that the same problem existed there but not to the extent as at WBN.

2. Inspection Rejection Notice (IRN) Program

Interviews with WBN personnel revealed that the general attitude toward IRNs was that they were not useful nor serve any purpose. Most WBN inspectors concurred with this conclusion and also stated they did not write IRNs anymore. It appeared from interviews with BLN inspectors that they did not fully understand the IRN system. This lack of understanding could be attributed to the fact that the BLN site had only recently implemented the IRN

procedure (October 1983). However, all the inspectors stated they had received training on BLN's IRN procedure. For additional details pertaining to the IRN program see sections VI.B.3 and 4.

3. Engineering - Quality Control Interface (Engineering Support)

The engineering-quality control interface was an area that was discussed with selected inspectors and quality control supervisors at both sites. The NSRS reviewers focused on the information flow and the adequacy of the information from engineering to inspection units. At WBN interviews with QC inspection personnel revealed that a very small percentage of those inspectors interviewed rated the interface (support) as good. The majority of inspectors described the support they received from engineering as less than adequate. The following are some of the concerns voiced by inspectors:

- Paperwork and/or forms were not consistently completed properly by engineering personnel.
- Work packages prepared by engineering did not contain all necessary documents to perform inspections.
- Field-issued drawings received inadequate engineering review.
- Inspectors provided to engineering personnel informal training on procedures and requirements by making them aware of necessary documents and proper completion of documents required to perform inspections.
- There was difficulty getting engineers to the field (problem locations).
- Work was not consistently ready for inspection when requested.

Generally, however, the quality control supervisors described the engineering support as adequate. One supervisor perceived the problem as engineering lacked experienced personnel. The assistant quality managers rated the support as adequate but one did state that he had heard complaints from inspectors that engineering was not performing their duties prior to requesting an inspection.

NSRS interviewed relatively few engineering personnel (at BLN or WBN) concerning this issue. As a result, incomplete input was received from WBN engineering as to the

validity of engineering-quality control interface problems. However, WBN management should consider this issue since the majority of QC inspectors interviewed perceived interface problems.

At BLN interviews with inspectors and QC supervisors revealed a different view of this interface (support). The majority of people interviewed described engineering support as adequate or better. One inspector did state that he had problems with getting requests for inspection of items that were not ready. The unit supervisor substantiated that this had been a problem in the past but that engineering had improved.

QMO Description of Transition Plan Responsibilities

As a result of the OQA Transition Plan (OQA 830222 403) and as described in proposed Topical Report, Revision 7, the QMO was directed to assume the responsibility for selected QA practices previously performed by CONST QAB. Among those transferred practices were:

- Perform independent review and approval of site-generated quality procedures and documents
- Review of and concurrence with NCRs

NSRS observed that site procedures had been appropriately revised to address QMO responsibilities in these areas. From a review of selected QCIs and QCPs, it was apparent that the QMO staff was performing review of procedures and that the procedures were approved by the Quality Manager.

In an interview with the Quality Manager at WBN, he stated that an attempt was being made to augment his staff section to provide a wider range of expertise for the review of procedures and documents.

In NSRS Report R-81-28-WBN, item R-81-28-WBN-14 had been opened against CONST QAB, site QA unit for performing inadequate procedure reviews. As explained above, since this function was transferred to the QMO, and verified by NSRS to be appropriately procedurally controlled and implemented, R-81-28-WBN-14, Inadequate Procedure Review is closed.

B. Quality Manager's Program and Organization - Implementation

1. QM Organization

The QMO at WBN was structured at a level comparable to the Construction Engineering (CE) and Construction Superintendent (CS) organizations. The Quality Manager (QM)

position was classified as M-7, which was the same rating as the CE and the CS. All three managers reported directly to the project manager, thus giving each organization equal input into the decision-making process. The QM had three assistants (M-6s) who had quality units assigned to them. One Assistant Quality Manager at WBN had the responsiblity for the technical services units (i.e., Document Control Unit, Procedure and Training Unit, Nuclear Licensing Unit and the N-5 Unit). These units did not perform quality control inspection functions. The two remaining Assistant Quality Managers were responsible for units which provided inspectors for various disciplines (i.e., civil, electrical, instrumentation). All the units, whether performing inspection or technical service functions, had managerial supervisors. The Inspection Unit supervisors were classified at the same level (M-5) as their counterparts in the engineering and craft units. The QMO at BLN was essentially the same in structure as the one in effect at WBN. From an interview with the WBN Project Manager, NSRS learned that several meetings between the projects had been held prior to the implementation of the QMO. These meetings were for the purpose of designing the QMO so that each site would be the same. Interviews with site personnel (WBN and BLN) revealed only one major difference in organizational functions.

At WBN the Electrical, Instrumentation, Mechanical, and Hanger Quality Control Inspection Units performed visual welding inspections. These inspections were final visual examinations for welds made on typical seismic supports. At BLN all welding inspections were done by the Welding Quality Control Unit.

From a review of 1983 Management Performance Goals and Appraisal Summaries (MAS) and Job Descriptions for selected QMO management personnel, it appeared that increased emphasis had been placed on achievement of quality activity and administration goals. Production schedule and cost-related goals had been de-emphasized, although, as reasonably expected, not eliminated. MAS goals for fiscal year 1984 were still being developed for QMO personnel. Quality managers at both sites explained they would probably remain similar to those for 1983, but were awaiting division-level input prior to submission.

Interviews with WBN and BLN QC personnel indicated that inspectors had no concerns of harassment or interference from craft, engineering, or their own management. The majority of inspectors felt that forming the QMO was a good decision because they perceived that it gave the QC groups independence from engineering, provided them with a clear understanding of their responsibilities, and/or put them under a supervisor who was responsible only for

quality. Most inspectors stated that the new organization had not changed the way they performed inspections (i.e., they were getting a quality product previously and were getting a quality product now). However, most inspectors related to the NSRS reviewers that they had not been informed why the organization was formed or what new functions it would be performing. In essence, inspectors stated all they had been told was the QMO was being formed and they would be a part of the organization. Some managers at WBN and BLN indicated they did not have a good understanding why the organization was created because they hadn't received any more information than the inspectors.

2. Training and Certification Programs

The NSRS activities in the areas of QC training and certification consisted of a review of the organizations within the Division of Construction and the QMO which were responsible for those activities. The review process included a review of upper-tier documents; site implementing quality control procedures (QCPs); quality control instructions (QCIs); training/certification documentation; general program administration and personnel interviews .

Collectively the review indicated that the overall CONST QA/QC training and certification program was in compliance with upper-tier requirements and site specific implementing instructions. The review also identified several areas of programmatic weaknesses and inconsistencies in the interpretation and implementation of the CONST QA Indoctrination Training and Qualification Program Manual (QATM). The QATM was developed by the CONST Quality Engineering and Support Staff (QESS) to delineate the training and qualification requirements for personnel performing activities affecting quality. The QATM was issued for implementation on June 1, 1982.

The concerns identified with the QATM were based upon interviews with QMO training personnel including QC unit personnel and a comparison of QATM implementation between WBN and BLN. The implementing specifics of the QATM will be discussed under the respective site findings. The following discussion addresses the generic concerns identified in the QATM as they apply to the overall QA/QC training and certification program:

- Lack of Definitive Guidance in the Development and Implementation of Training Programs:

  The QATM failed to identify training program parameters for engineering, craft, and QC personnel. For example, QATM Section II, "Experience, Training,

and Qualification of Personnel not Requiring Certification," (2.1, 2.2, and 2.3) failed to adequately specify levels of acceptable experience for evaluation of new hires, content of on-the-job training programs, or to establish requirements that qualify an individual to perform a required function.

- Specific Organizational Responsibility for QA/QC Training:

  The QATM failed to specify organizational responsibility for craft and engineering QA/QC training.

- Failure to Establish Guidance to Determine Effectiveness of Training Programs

  The QATM failed to provide a methodology of determining the effectiveness of the training and certification program. However, it was noted that BLN had recently instituted a training effectiveness evaluation program for craft and engineering personnel. (see section V.B.2.b for details).

a. <u>WBN Training and Certification Program</u>

The QA/QC training and certification program was performed by three separate organizations under the control of the Project Manager. The Quality Manager's Organization (QMO) was responsible for general employee indoctrination, QC inspector training and certification, and the monitoring of craft/engineering training. The Construction Engineering Organization (CEO) was responsible for engineering unit personnel QA/QC training. The Construction Superintendent's Organization (CSO) was responsible for craft QA/QC training.

Requirements for the training of construction personnel were identified in the following site procedures:

QCI-1.11-1, R2, "Indoctrination and Training Program

QCI-1.11-2, R5, "Qualification/Certification of Construction Quality Control Inspectors"

QCI-1.11-3, R0, "Qualification Program for Engineering Functions"

QCI-1.11-4, R1, "Craft Qualification/Certification Program

QCI-1.37, R7, "Quality Assurance Organization -Watts Bar Nuclear Plant"

The NSRS review at WBN entailed a comparison of the above procedures with project training activities and QATM requirements. All procedures reviewed were in accordance with QATM requirements.

Quality Manager's Organization (QMO)

QMO training and certification responsibilities were divided between the Procedures and Training Unit (PTU) and individual QC units, i.e., Hanger QC, Mechanical QC, etc. The PTU had two primary responsibilities: the administration of general employee indoctrination and QC inspector certification. Indoctrination training was conducted by the PTU staff on an as-needed basis. A review of the indoctrination course outline and previous attendance documentation noted that applicable requirements identified in QATM, section I, and QCI 1.11-1 had been addressed. The PTU role in QC inspector certification was administrative while the individual QC units provided the actual training. The PTU developed, administered, and graded the various QCP examinations which were used for inspector certification. The results of those examinations were subsequently transferred to the Personnel Certification Record (PCR) and were kept on file in the Document Control Unit (DCU). The PCR served as the official inspector certification documentation. A random review of PCRs for QC inspector personnel indicated no discrepancies in the correlation between required procedure certification and documented certification.

In support of QC units, the PTU developed lesson modules for each procedure which were required for QC inspector certification. The modules were structured in a standard lesson format, i.e., title, objectives, references, training aids, hand-outs, etc., and were designed to be used with the certification procedures. Interviews with QC unit training personnel indicated that the modules were utilized primarily for training of new personnel. Modules were revised by the PTU and reissued to QC units as necessitated by procedure revision and/or modifications. The NSRS review indicated that the process was working as designed; and though not required by site or division-level procedures, modules were available and in use at most QC units. Additional administrative support, such as classrooms, training aids, and adjunct instructors, was provided by the PTU to QC units as needed.

The PTU monitored QA/QC training for craft, engineering, and QC unit personnel. Monitoring activities consisted of a review of attendance documentation and occasional observation of classroom activities. The monitoring program was designed to assure that training for required procedures was being conducted in accordance with QATM and QCI requirements. Review findings indicated that the program was effective in monitoring requirements implementation. However, interviews with craft, QC, and engineering training personnel also indicated that the monitoring program was considered to be of limited value. The predominate criticism was directed toward the lack of feedback from PTU monitors and the lack of authority in the program to achieve improvements in the quality of training.

Construction Engineering Organization

The Construction Engineering Organization (CEO) was responsible for providing the appropriate procedural training to engineering unit personnel. That responsibility was accomplished by training personnel within the individual engineering units, i.e., mechanical, electrical, hanger, etc. The CEO training program in QA/QC practices consisted of indoctrination and basic training in various quality control procedures. QCI 1.37, "Quality Assurance Organization - Watts Bar," identifies specific procedures which were required for training and/or certification by engineering and quality control personnel. Procedural training needs were based upon engineering disciplines and quality work activities performed by individual engineering units. A random review of training implementation and subsequent documentation, referenced against QCI 1.37 procedural training requirements, revealed no discrepancies.

Construction Superintendent's Organization

The CSO was responsible for providing QA/QC training to craft superintendents through hourly foremen. In addition, the hourly foremen, which represented the various craft disciplines, were providing QA/QC training to journeymen. The journeymen training program consisted of one-hour classes given twice a month (every other Tuesday of each month). The program was structured around the General Craft Training Module which was a composite of 18 QCPs. The module was issued on February 15, 1983 and contains the applicable aspects of each QCP which requires interface between craft, engineering, or QC personnel. The Craft Training Module was revised as

necessary. Those revisions were then addressed in scheduled training session and documented in accordance with training procedures. Training documentation was administratively processed by the Training Office for inclusion in the project training printout.

In an interview with the Assistant Supervisor, M&A Unit, he stated that the effectiveness of craft training was also monitored through the project trend analysis of IRNs, and instruction evaluation forms which were given to the craft once every three months. The inherent disadvantage of measuring training effectiveness through trend analysis appeared to be in that an individual's knowledge level or ability could not be determined until after the work had been performed. Further, the trend analysis must be structured to detect various levels of performance (reference section VI.B.3 for other details of NSRS trending concerns).

Instruction evaluation forms were provided to craft personnel every three months as a feedback mechanism to determine the quality of the QA training sessions. During the course of the review construction training personnel were unable to substantiate the use of the form for the preceeding three months. The decision to utilize the evaluation forms once every three months (which is equal to an evaluation of one out of every six classes) was based upon the economic consideration involving the pay rate per craft versus the time it would take to complete the evaluation (approximately 15 minutes). Construction supervisors felt that the cost incurred by completing the form at the end of each training session could not be justified and that the same effect could be achieved by using the form on a less frequent basis. Personnel interviews indicate that the forms had no practical application due to their limited use and the lack of substantive comments by craft personnel. However, at present the evaluation forms do provide the only basis of feedback of craft training. The quality of feedback information could not be determined by NSRS due to the lack of evaluation forms available for review.

The overall review finding for the WBN QA/QC training program was positive in that no items of nonconformance were identified; QA/QC training was a formalized element of the construction program; and the training certification program had improved over last year. The major concern identified by NSRS was the lack of a formal means to determine the effectiveness of training. There did not appear to be

any concentrated management effort in that direction at the time of the review. The methods which were in effect (i.e., trend analysis, evaluation forms, PTU monitoring, etc.) were informal, were not consistently applied throughout the WBN construction organization, and were considered by most personnel to be ineffective.

b. BLN Training and Certification Program

The QA/QC training and certification program at BLN was similar to that of WBN in that the three principle organizations, QMO, CEO, and CSO, were responsible for specific training and/or certification activities and were under the direction of the Project Manager. The principle documents that controlled the BLN training program were: QCP-10.29, R5, "Quality Assurance Training Program," and QCP-10.30, R4, "Craft Quality Assurance Training." The NSRS review process of the BLN training program was identical to that of WBN in that the above procedures were compared against project activities and QATM requirements.

The QMO was responsible for the organization, content and adequacy of the QC inspector training, qualification, and certification program; the overview of indoctrination and QA orientation; and the general monitoring of craft, engineering, and QC training/certification. The QMO responsibilities were divided between the Procedures and Training Unit (PTU) and QC units.

The PTU developed and administered certifying examinations for quality control inspectors. Examinations were based on procedural requirements for the inspection and/or testing of quality related activities and/or processes. A review of QCPs and associated testing material indicated that certification examinations were comprehensive in relation to procedural requirements. The administrative program utilized to document, update, and track individual QC inspector certification was functioning in accordance with established procedures. A random review of personnel certification records revealed no discrepancies in required inspector certification.

The employee indoctrination program is conducted by the Project Training Officer (PTO) and was developed, coordinated, and monitored by the PTU in conjunction with CEO and CSO. The course consisted of a basic introduction and general overview of QA activities at BLN. The program was mandatory for all new employees with re-indoctrination every three

years. Attendance was documented on Craft and/or Group Training Reports and maintained by the PTO for craft personnel and by unit training officers for engineering/QC personnel.

PTU monitoring activities in the area of QC inspector training involved periodic reviews of individual QC unit training records, on-the-job training programs, and observation of classroom instruction. Reviews were based on QC unit activities and were considered as beneficial by unit training personnel. PTU monitoring of craft and engineering training involved random observation of classroom activities, training scheduling and subsequent documentation reviews and personnel testing. The personnel testing began in August of 1983 in response to an INPO report which noted that BLN did not have a feedback program that allowed management to evaluate the effectiveness of the training program.

The testing program was based on specific QC procedures on which craft and engineering personnel were required to be trained. A typical test consisted of five questions which were directly related to a specific quality control procedure (QCP). Tests were administered to craft personnel during scheduled training sessions and to engineering at random. During scheduled training sessions a pre-test, which relates directly to the QCP under discussion, was administered, training in the QCP was provided, and a post-test was given. Random testing was conducted by the PTU selecting personnel from the various engineering disciplines and administering one test on any QCP on which those individuals were required to be trained. The results of the testing were compiled by the PTU and provided to the Quality Manager. At the time of the NSRS review the Quality Manager, in conjunction with engineering and craft supervision had not determined how the testing data was to be utilized to improve personnel knowledge and training efficiency.

The NSRS review of the testing program and related documentation revealed several significant concerns, the first of which deals with the inordinately high rate of failure among craft and engineering personnel in QCPs. For example, the following data provided by the Assistant Quality Manager represents 18 craft training sessions in applicable QCPs and 5 random tests of various engineering disciplines.

Craft Testing Results

Procedure	No. Tested	Pre-Test Failure Rate	Post-Test Failure Rate
QCP-1.2	3	100%	33%
QCP-1.3	6	50%	0
QCP-2.8	6	83%	33%
QCP 2.15	3	67%	67%
QCP-3.2	4	100%	0
QCP-3.3	6	100%	0
QCP-6.7	3	67%	0
QCP-6.16	1	100%	100%
QCP-7.5	13	100%	54%
QCP-7.9	9	78%	33%
QCP-8.1	6	33%	0
QCP-8.2	1	100%	100%
QCP-10.2	5	40%	20%
QCP-10.4	8	75%	13%
QCP-10.5	11	64%	36%
QCP-10.6	7	86%	0
QCP-10.9	3	0	0
QCP-10.33	8	100%	0

Engineering Testing Results

BNP-QCP-2.2 R14, Total number tested: 10
(Civil)

Satisfactory: 7
Unsatisfactory: 3
Failure rate: 30%

BNP-QCP-6.13 R6, Total number tested: 10
(Civil)

Satisfactory: 5
Unsatisfactory: 5
Failure rate: 50%

BNP-QCP-6.10 R5, Total number tested: 9
(Mechanical)

Satisfactory: 8
Unsatisfactory: 1
Failure rate: 11.1%

BNP-QCP 3.13 R6, Total number tested: 8
(Instrumentation)

Satisfactory: 3
Unsatisfactory: 5
Failure rate: 62.5%

BNP-QCP 3.13 R6, Total number tested: 10
(Electrical)

Satisfactory: 1
Unsatisfactory: 9
Failure rate: 90%

The second concern addressed the corrective action for personnel who fail random testing and/or training posttesting. The NSRS review noted that craft and engineering personnel who failed QCP testing continued to work but did not receive remedial training nor were there any other forms of corrective action to assure that such personnel were adequately trained and qualified prior to performing quality related activities. Conversations with the Quality Manager and Project Manager indicated that they were aware of the need to improve the effectiveness of training and that several options were being considered, including retraining and testing of personnel who fail.

Support activities of the PTU involved the coordination of training aids, classrooms, and instructional personnel. Training support was available to craft, engineering, and QC units as needed and were considered adequate by the training personnel of the various organizations.

Training for QC inspectors was conducted by individual QC units. A review of Hanger, Electrical, Instrumentation, and Mechanical QC Units indicated that the structure and format of training program among the different units were similar.

Though all unit training programs reviewed were meeting Construction Quality Training and Qualifications Program Manual and QCP requirements, the depth of training programs varied considerably. Most noteworthy was Mechanical QC. Each element within the Mechanical training program was clearly defined. For example, the subject and approximate duration of training were defined for selfstudy, classroom sessions, and on-the-job training. Specific learning objectives were defined for each subject. Requirements for the documentation for each phase of the program were clearly defined. The depth of instruction and subsequent testing assured that trainees were amply qualified prior to certification by the PTU. Procedural certification for QC inspectors requires a passing score of 70 percent, Mechanical QC requires a 90 percent score during training in the same procedure. Other QC units' programs, while adequate, did not have the depth, clarity, or organization which was evident in the Mechanical QC Unit.

The Construction Engineer Organization (CEO) was responsible for conducting procedural training and implementing on-the-job training for engineering personnel. Training was based on applicable quality

control procedures and construction test procedures (CTP) for the basic engineering disciplines. Required training was specified on Unit Certification/ Training Requirements List which identified specific procedures for each engineering unit. The list was reviewed and approved by the PTU. CEO training was documented on the Group Training Report and was distributed to the PTO for inclusion in the Bellefonte Certification/Training Computer Program. In addition, the Unit Training Officer (UTO) maintained a copy on file. The NSRS review of the CEO training program administration indicated that the program was being implemented and documented in accordance with the QATM and site training procedures.

The Construction Superintendent Organization (CSO) is responsible for the training of craft superintendent, assistant craft superintendent, and hourly foremen. The CSO program consisted of indoctrination, QCP, and CTP training. Training requirements for respective craft disciplines were identified in QCP-10.30, "Craft Quality Assurance Training." The procedure also identified documentation requirements, reindoctrination timeframes, and the general administrative process for craft training. The NSRS random review of craft training practices revealed no discrepancies.

c. Observed Differences Between Project Programs - WBN/BLN

During the course of the NSRS review there were several significant differences observed in the implementation of the WBN and BLN quality assurance training programs. The observations were made in the areas of craft training, training effectiveness evaluation, and PTU program support. The significance of each area was based upon the existing and potential benefits which the particular activity afforded the program, the lack of a similar activity at a corresponding project and the willingness of project management to utilize nonrequired training/ evaluation techniques to improve the long term effect of QA training.

The Construction Superintendents Organization (CSO) at both Watts Bar and Bellefonte were responsible for the training of craft superintendents, assistant craft superintendents, and hourly foremen in applicable QA/QC procedures. (See section VI.B.2.a and b for respective organizational programs.) Craft training activities were similar at WBN and BLN due primarily to QTP requirements. The most noted

difference was identified at WBN where craft journeymen were receiving formal, documented training in QC procedures whereas at BLN they were receiving only the general QA indoctrination.

Journeymen training was conducted by craft foremen at WBN and was designed to enhance the quality assurance knowledge of craft personnel who perform quality work activities. Interviews with CSO personnel at WBN indicated that the journeyman program was considered to have had a positive effect on quality activities. In addition, the assistant construction superintendent indicated that the program would also include the use of engineering personnel to provide technical and instructional assistance in the future. The evaluation of the program by the CSO was based on a review of IRNs by CSO training personnel.

Overall, NSRS considered the journeyman training program as a positive step toward improving quality-related work activities. BLN did not have a program to provide formal training in QCPs directly to journeymen in effect at the time of the NSRS review.

The Construction Quality Training and Qualification Program Manual (QTP) did not require or provide a structural format to measure the effectiveness of QA training. The BLN project was measuring training effectiveness through random testing of craft and engineering personnel. Watts Bar measured only craft personnel training effectiveness through identification of significant activities from the IRN trend analysis, and use of evaluation forms.

The impetus for the BLN program was in response to the 1982 Self-Initiated INPO Review in which TVA committed to establishing a feedback program that would require managers to evaluate the effectiveness of each training program undertaken. (See section VI.B.2.b for details of the BLN training evaluation program.) The WBN quality manager indicated that they were supposed to evaluate the BLN INPO findings and TVA responses for applicability at WBN. The NSRS review determined that the effectiveness of training was being evaluated for craft personnel through the use of QA trend analysis. Engineering training was not being evaluated.

The QMO Procedures and Training Unit (PTU) at WBN and BLN were primarily responsible for general employee indoctrination training, QC inspector certification, and the general monitoring of craft, engineering, and QC training. The PTU also provided

administrative support for project training activities (see section VI.B.2.a and b for PTU programs). The most noted difference between the WBN and BLN PTU programs was in the area of training support. Specifically, the development of lesson modules by the WBN PTU. The lesson modules were designed to be used in conjunction with procedures which were required for QC inspector certification. The modules also identified reference material, training aids, and technical specifics for the procedure on review. (See section VI.B.2.a for lesson module details.) The BLN PTU did not provide equivalent material but relied upon independent QC units to develop necessary instructional aids.

Other differences between the WBN and BLN QA training programs were of minor significance and for the most part reflected individual project administrative preferences.

3. Corrective Action Programs

This part of the review was conducted to determine that site practices for identifying deficiencies and obtaining timely corrective actions were prescribed procedurally and demonstrated effective. Among the methods available to achieve those purposes, which NSRS reviewed, were allegation and employee concern reporting, stop work authority (and use), the nonconformance report (NCR) and inspection rejection notice (IRN) systems, use of Quality Bulletins, and trend analysis. Also reviewed were the site actions in response to INPO findings associated with the evaluation of the effectiveness of craft and engineering training. This information is detailed in section VI.B.2.b and c.

a. Watts Bar Nuclear Plant (WBN)

Allegation Reports - The initiation and investigation of employee allegations was administratively controlled by WBNP-QCI 1.31, revision 2 of April 17, 1982. This instruction provided for independent investigation of, and disposition and necessary corrective action to, employee allegations. From a review of completed allegation reports and logs, it was determined that applicable allegation reports had been investigated and resolved by an assistant quality manager and that no allegations had been filed in 1983, as of November 2, 1983. CONST-QAP 16.4, "Allegations, Employee Concerns, and Employee Differing Opinions," revision 1 of October 19, 1983, identified the difference between an "allegation"

and an "employee concern" requiring programs for handling and resolving each. The Watts Bar QCPs and QCIs did not contain a procedure for specifically controlling the handling of employee concerns and differing opinions as did the QCPs for Bellefonte, nor did WBNP-QCI 1.31 address employee concerns as differing from allegations.

This situation was considered an example of inconsistency of program application between sites rather than a site program omission since other methods, such as TVA Code II, were available and have been used by personnel to voice concerns and differing opinions.

Stop Work Authority - WBNP-QCI 1.32, revision 3 of September 19, 1983, "Stop Work Authority," grants this authority to the Quality Manager (as well as to the Construction Engineer). From a review of records and the stop work log, it was determined that stop work was initiated four times in 1982 and once in 1983. The stop work order issued in 1983 was still in effect, pending resolution. This phase of corrective action appeared to have been adequately prescribed and implemented.

Nonconformance Reports (NCRs) - WBNP-QCI 1.02, revision 8 of October 17, 1983, "Control of Nonconforming Items," had been revised to comply with recently revised requirements of division policy and procedures. It appropriately specified the responsibilities of the QMO for review of NCRs, dispositions, and NCR trend reports. Selected NCRs, logs, and trend reports were reviewed by NSRS. It was also observed that training in the procedure had been provided to engineering and QC personnel. This phase of corrective action appeared to have been adequately prescribed and implemented.

Inspection/Rejection Notices (IRNs) - WBNP-QCI 1.02-1, revision 5 of April 20, 1983, "Inspection Rejection Notice," defined and controlled the use of the IRN. The procedure required that QC inspectors write IRNs to document deficient or incomplete work upon completing a required inspection if the identified problems cannot be corrected during the inspector's shift and unless the problem constitutes a nonconforming condition (requiring NCR vs IRN initiation). The procedure also required that QC units and their management prepare and review monthly IRN "status" reports in order to disclose and correct potential adverse trends. IRNs were directed by the QC units to crafts and/or construction engineering for resolution.

NSRS reviewers found through interviews with QMO/QC personnel, observation of inspections in progress, and reviews of IRN logs and trend reports that apparent wide variations existed among QC units regarding the interpretation of the intent of the procedure and its implementation. Some inspectors stated in interviews and demonstrated during observed inspections that they did not write IRNs because they caused problems with the crafts. They would instead void the requested inspection explaining to the craft involved the extent and nature of the deficiencies. The craft could then perform the work, regardless of the deviation, and again request inspection when ready without the documentation of an IRN. This informal process did not appear to be in accordance with the intent of QCP 1.02-1. Information compiled from the seven most recent monthly IRN trend reports is displayed as a matrix in attachment 2. It indicates that the QC units apparently reluctant to issue IRNs are Welding QC, Hanger QC, and Civil QC. The composite average for these units was .077 percent IRNs per "inspection" or 1264 "inspections" performed for each IRN issued. The composite average for the remaining QC units (Mechanical, Electrical, Instrumentation, and Material Services) for the same period was 6.6 percent or one IRN issued for 15 "inspections" performed. The term "inspection" is enclosed in quotation marks since considerable latitude was permitted the units in determining and defining exactly what constituted an inspection. It was stated by the Quality Manager that not all inspections were required to be documented, and especially in the Civil QC Units, one inspection acceptance document could consist of many, perhaps dozens, of "inspections." He also stated that the Hanger QC Unit had to write fewer IRNs now that the "Pending FCR" program was in use (i.e., if a field change notice (FCR) had been initiated on a hanger varying from requirements but unapproved at the time of inspection, the hanger could still be conditionally accepted). These factors could mitigate the apparent extreme disparity among units identified by attachment 2.

NSRS reviewers verified with selected QC units that supervisors were reviewing the IRN log to detect potential trends as required by the procedure. This area is discussed further in Trend Analysis and Reporting, following the next section.

Quality Bulletins (QBs) - At the time of the review there was no site procedure for controlling the review or investigation of Quality Bulletins. WBNP-QCI 1.54, revision 0 of November 15, 1983,

"Handling Quality Bulletins," was approved and issued following the review onsite and appeared to adequately address the requirements of the division procedure QAP 16.7 of October 19, 1983. From a review of CONST QESS Quality Bulletins and the log of QBs, there was evidence that the Quality Manager's Organization had appropriately acted on QBs issued prior to approval of the site procedure. QB 83-15 issued November 4, 1983, associated with inspection of interior weld surfaces was reviewed by the QMO, resolution was determined, and it was returned as required within 30 days on November 17, 1983.

Trend Analysis and Reporting - Information requiring trending at WBN was identified in WBNP-QCI 1.58, revision 0 of May 16, 1983, "Trend Analysis." This procedure specified that nonconformance reports, OQA audit deviations, ASME III survey deficiencies, authorized nuclear inspector's special inspection service reports, NRC inspection reports, and NSRS items were to be reviewed, evaluated, and included in quarterly or semiannual trend analysis reports. The list of items to be trended was more extensive than that required by the division-level procedure QAPP 16, revision 4, addendum 1 of November 10, 1983, and proposed Topical Report Revision 7. However, QAPP 16, revision 4, addendum 1, did not include all items required by proposed Topical Report Revision 7. Responsibility for execution of the trend analysis program was assigned by site procedure to the QMO. Though not specified by the procedure, trending was performed by the QMO's Procedures and Training Unit (PTU).

NSRS reviewed quarterly Quality Trend Analysis Reports of Audit Items (TAAI), Quality Trend Analysis Reports of Significant and Reportable Items (TASR), and the semi-annual Quality Trend Analysis Reports (TA) from 1980 through the present. It was noted that CONST QA (site) had prepared and distributed these reports prior to implementation of the QMO in February 1983. A summary of the data from this review is tabulated in attachments 3 and 4. A statistical analysis of the data was not performed. The format of these reports indicated that raw data from the current report was compared with that of the corresponding previous report, but that a comprehensive or cumulative comparison was not made. Interviews with the Quality Manager and the Supervisor, PTU, revealed that they considered the trending to be of little value. It was stated that among the problems were: a trend had never been identified as a result of the reports, nor had there ever been

substantive feedback from reviewing management. Additionally, the quality, timeliness, and structure of the information accumulated and presented in the reports was not considered adequate to permit identification of meaningful trends. NSRS concurred that the implemented program was ineffective.

Inspection/Rejection Notices were trended by QC units on a monthly basis for review by the Assistant Quality Managers and Quality Manager. NSRS reviewed these reports (attachment 2), and observed occasional questions raised by the QM concerning unit report results. Generally, however, the unit analysis was reported as "no discernable trends." As with the TAAI, TASR, and TA reports, no cumulative data were maintained or reported for analysis. The Quality Manager stated in an interview that through the IRN trend reports he had become aware of a problem of work turned in for inspections which was found to be incomplete upon inspection but that corrective action to resolve this situation had not been undertaken.

It was also noted by NSRS that the unit trend reports provided a baseline for potential "normalization" of data (although this was not performed) by reporting both the number of IRNs written and the number of inspections performed in a given period. However, as previously stated, there was variation between units concerning the meaning of "inspection," which could have reduced the value of this information.

IRN trend reports were not distributed to the project manager, nor to offsite CONST management.

b. Bellefonte Nuclear Plant (BLN)

Allegation Reports - The initiation and investigation of employee concerns and differing opinions and of allegations was administratively controlled by Bellefonte QC Procedures BNP-QCP 10.35, revision 1 of January 3, 1983, and BNP-QCP 10.28, revision 1 of December 10, 1982, respectively. These procedures provided for investigation of concerns and allegations by the QMO. BNP-QCP 10.35 contained provisions for independent investigation of concerns by either the QMO, or in the case of potential conflict, by site QA as well as emphasis on the employee's right to bypass intermediate management levels for resolution of concerns. The following table, extracted from concern and allegation logs

and reports maintained by the QCRU describes the recent history of these corrective action mechanisms:

Employee Concerns and Differing Opinions

	Year Initiated		
	1981	1982	1983
No. Initiated	1	2	1 (Differing Opinion Initiated 8/29/83)
Unresolved (12/1/83)	0	0	1 (Awaits EN DES Action)

Allegation Reports

	Year Initiated			
	1980	1981	1982	1983
No. Initiated	9	7	3	1
Unresolved	0	0	0	0

NSRS noted minor apparent administrative problems with maintaining report files current. Although resolution had been effected, one differing opinion initiated in September 1982 was not closed until questioned by NSRS in November 1983, and the allegation report of 1983 (No. 24) should also have been closed according to the Compliance Supervisor but had not been when reviewed by NSRS.

All reports reviewed for 1982 and 1983 indicated investigation by the QMO as required or permitted by procedure.

Although not directly a part of the review, informal conversations with the departed NRC resident inspector prior to the review indicated that in 1983 he was not receiving the number of allegations reported to him as he had previously experienced. In combination with the above table, this information could indicate an actual decrease in the number of discerned problems and/or an improvement in the "trust" of employees that their supervisors will adequately resolve problems brought informally to their attention. This phase of corrective action appeared to have been adequately prescribed and implemented.

Stop Work Authority - BNP-QCP 10.33, revision 4 of December 12, 1981, "Stop Work Procedure," prescribes the controls and authority for this action. Stop work authority was granted to "Any employee having quality assurance/quality control responsibilities . . . ." This procedure did not reflect the new QMO or reassign responsibilities for evaluation of corrective action. However, from a telephone conversation with the Supervisor of the Procedures and Training Unit on December 6, 1983, it was learned that revision 5 to QCP 10.33 had been approved with an effective date of December 12, 1983, which corrected the situation.

A review of the stop work log and stop work documents maintained by the QMO indicated that the authority had been exercised on three occasions in 1981, six times in 1982, and twice in 1983. Resolution had been obtained on all except the two most recent occasions. This phase of corrective action appeared to have been adequately implemented and with the issue of BNP-QCP 10.33, revision 5 of December 12, 1983, will be adequately prescribed.

Nonconformance Reports - BNP-QCP 10.4, revision 10 of November 1, 1983, "Control of Nonconformances," with addendum 1 of November 23, 1983, had been revised to comply with revised requirements of division-level policy and procedures. It appropriately specified responsibilities of the QMO in initiating, reviewing, and distributing nonconformance reports and verifying corrective action. Revision 10 of the QCP specified that revision 9 was to remain effective for the control of outstanding QC investigation reports (QCIRs) since that program had been replaced by the inspection/ rejection notice (IPN) system described in the next section. Trend analysis requirements for NCRs were not prescribed or referenced by QCP 10.4, but were identified in BNP-QCP 10.41, "Trend Analysis Program."

NSRS reviewers accompanied a hanger QC inspection team during a "peer review" of a previously inspected and accepted Grinnel sway strut. The hanger was observed to deviate from acceptance criteria, requiring initiation of an NCR. Although not written while NSRS was onsite, a follow-up telephone conversation with the lead inspector indicated the NCR had been initiated and assigned number 2547. It was stated by the Quality Manager that this incident was the first such occurrence since "peer review" had been initiated and in the absence of the QCIR system.

This program appeared to have been adequately prescribed. It was considered by NSRS that recent NCR program changes rendered an assessment of implementation adequacy indeterminate. Additional changes to nonconformance reporting and resolution were anticipated by project management when OQA issues a Management Policy Requirement on deviation control.

Inspection Rejection Notices (IRNs) - BNP-QCP 10.43, revision 0 of November 1, 1983, with addendum 1, "Inspection Rejection Notice," provided the administrative control and requirements for the IRN deficiency reporting and correction system. This system replaced the Quality Control Investigation Report system in November 1983 whereby observed or suspected problems were identified for evaluation and resolution by Construction Engineering. According to project management, this was done in an effort to reduce paperwork and improve the productivity of both the crafts and engineering personnel.

The procedure appeared to have provided inadequate and potentially confusing requirements and information. Among the problems noted during the review of the procedure and observation of the inspection process were:

(1) Responsibility for determination of corrective action was unassigned. Correction was presumed to be accomplished by the involved craft.

It was apparently intended that the crafts would involve Construction Engineering if they were unsure about a corrective action, but criteria for making this determination were not specified. NSRS observed a reinspection of a "corrected" IRN condition in which the allowable gap between a hanger base plate and the wall to which it was mounted (by welding and bolting) was excessive. The corrective action taken had been to run a line of cement grout around the gap. As this "correction" was unacceptable, the QC inspector properly rejected the hanger again and wrote a new IRN.

(2) The procedure required the voiding of an IRN if, upon reinspection, the deficiency had not been corrected and the initiation of a new IRN on the same problem. It was not clear how voided IRNs were to be used for trend analysis purposes.

Additionally, the procedure required a weekly report to the QM of IRNs not corrected within five days. It was not clear whether "replacement IRNs," written when an IRN is voided as indicated above, extend the five-day deadline although the stated purpose of the weekly report was to notify management of "areas that require more timely corrective action."

Training had been provided to QC inspectors and engineering personnel in the IRN procedure. However, interviews with selected QC and engineering personnel revealed some confusion regarding the system. Two inspectors told NSRS they were no longer allowed to initiate NCRs. Another inspector stated he would write an IRN only if the problem could be immediately corrected; otherwise, he would write an NCR. One engineering unit supervisor stated he was not sure how the IRN program would work or how it interfaced with nonconformance reporting.

It was noted that the IRN program had been implemented for less than two weeks when reviewed by NSRS. Some degree of confusion and misunderstanding was anticipated and that found was not considered abnormal. Misconceptions should be corrected as the process becomes more familiar.

Quality Bulletins (QBs) - The procedure for describing site actions and responsibilities upon receipt of a CONST Quality Bulletin, BNP-QCP-10.44, revision 0 of November 7, 1983, consisted of only the division procedure, QAP 16.7, revision 0, as an attachment to a site coversheet and table of contents. Section 7.3 of QAP 16.7 does generally describe project action, requiring recipients (e.g., project managers) to initiate investigation of the issues, take action as required, and to document and return results to QESS. The site process for accomplishing this activity is not described in detail. In an interview with the Quality Manager, he stated that no Quality Bulletins had been received at that time. However, subsequent interviews with QESS personnel indicated that three bulletins had been issued and should have been received. Additional investigation revealed that the QBs had been received by the project manager who had delegated them for action to the Construction Engineer instead of the Quality Manager. In a telephone conversation with the Quality Manager,

he stated that the project management-agreed practice would be to delegate action for QBs to the Quality Manager.

This situation appeared to be a second example of the expected confusion associated with a new or significantly revised program. Unless continued responsibility, routing, or timeliness difficulties are experienced, the QB site action program intent appeared to be sufficiently straightforward as presently prescribed.

Trend Analysis - Trend analysis at Bellefonte was required to be performed in accordance with BNP-QCP 10.41, revision 0 of September 30, 1982, "Trend Analysis Program." This procedure identified the corrective action information to be trended and provided the requirements for preparation and review of the reports. Items to be trended included IRNs, NCRs, NRC violations, OQA deviation reports, and automated process control reject records. This listing failed to include ASME III survey results and authorized nuclear inspector audit deficiencies requiring trending by the Topical Report, proposed Revision 7. In interviews with the Supervisor, Procedures and Training Unit, and the Quality Manager, both acknowledged the omission but stated deficiencies identified by those methods would be reported for trending as site-generated NCRs.

ASME III surveys are required to be performed once each three years and ANI audits once each six months. The value of trending deficiencies from these sources was considered by NSRS of less importance than review of the deficiencies for potential impact at other facilities, due to their frequency.

Responsibility for execution of the trend analysis program was assigned by procedure to the QMO, with the Procedures and Training Unit responsible for compilation of unit reports and generation and distribution of the necessary project and summary reports. Summary reports of IRN and APC deficiencies were required to identify only those deficiency types which represented five percent or more of the total deficiencies for the monthly period. IRN trend reports from units did not identify the number of inspections performed during the period. NSRS reviewed the quarterly trend reports of

audit items and significant items (TAAI and TASR reports). It was noted that these reports had been prepared and distributed by CONST site QA prior to implementation of the QMO in February 1983. A summary of data from this review is tabulated in attachment 4. As with the trend program at Watts Bar, cumulative data for historical comparision was not available in the report. IRN trend reports had not been generated because that program had only recently been implemented (November 1983), but the required format was observed to be similar to that of the previous QCIR trend reports.

In an interview with NSRS, the Quality Manager stated his belief that the new trend analysis procedure should be more effective than the previous method because it required analysis at the unit level as well as follow-up reporting on recommended remedial actions. No quarterly or IRN reports had been generated under the controls of BNP-QCP 10.41, revision 0, at the time of the NSRS review so an effectiveness assessment was not made.

c. Comparison-Corrective Action Programs

NSRS reviewers compared the programs and implementation for five elements previously identified in sections VI.B.3.a. and b. as constituents of corrective action. The purpose of this comparison was intended to identify which programs, or portions of programs, appeared stronger or better controlled at one site than the other due to allowable differences in implementation within the guidance of the CONST QA Program Manual.

Allegation Reports - Watts Bar had no procedure specifically addressing employee concerns and differing opinions, as did Bellefonte. Neither program was observed to be especially active, however, as no allegation reports had been indicated at WBN in 1983 and only one allegation and one differing opinion at BLN.

Stop Work Authority - With the initiation of BNP-QCP 10.33, revision 5 , on December 12, 1983, there should be no substantive difference between the programs at WBN and BLN.

Nonconformance Reports - There appeared to be no substantive differences between these programs at WBN and BLN.

Inspection Rejection Notices - Although recently implemented at BLN, there appeared to be a major philosophical difference in initiation of IRNs between the sites. WBN QC Personnel would not initiate, per procedure, IRNs for deficiencies correctable within the inspector's work day. They may also assign IRNs to the CONST Engineering Group for resolution. Bellefonte inspectors had been instructed to write IRNs for all problems regardless of how quickly resolved. One inspector expressed a belief that if the problem could not be immediately corrected, an NCR should be initiated. The BLN QCP controlling IRNs did not assign responsibility for determining the adequacy of a proposed resolution. There was no division-level procedure for the control of IRNs.

Quality Bulletins - Watts Bar had recently issued a site procedure defining and describing site action in response to a QB. Bellefonte had also issued a procedure, but it consisted of only the division-level procedure as an attachment to a BNP-QCP coversheet. The division-level procedure did not detail site responsibilities or actions in response to a QB but appeared to be straight-forward in intent.

Trend Analysis - The most significant difference in implementation of the trend programs between the sites was observed in the distribution of reports and the method of determining the baseline of reported information. At WBN monthly IRN trend reports were maintained internal to the QMO. IRNs were reported as a percentage of inspections performed (although "inspection" was not well defined.) At BLN, IRN trend reports were distributed to the Construction Engineer, Project Manager, and offsite to the Assistant Manager, CONST. To be reported, however, the number of IRNs associated with a given defect, cause, or origin, had to constitute five percent or greater of the total IRNs initiated for the summary report period, regardless of the number of inspections performed. It was also noted that the two sites' implementing procedures required different deficiency report types to be included in trend reports.

There was no division-level procedure controlling trend analysis, although the subject was reported under consideration.

4. Inspection Process

As a part of the QMO review, NSRS observed inspectors performing inspections on selected activities at each site. An activity chosen was hanger (support) inspection. The following accounts of hanger inspection were gathered by NSRS reviewers by interviews with the inspectors and observation of the inspections actually performed:

Watts Bar

At WBN the crafts initiated the hanger (support) inspection process. The first step was to request that a "pull test" on the embedded anchors (if applicable) be performed. In order to get this inspection performed, the craftsman completed attachment C of WBN-QCP-4.23 and signed the inspection-request log. After completion of this activity the craftsman requested a final hanger (support) inspection by completing attachment A of WBN-QCP-4.23 and signing the inspection log. (Reviewer's note: WBN-QCP-4.23, "Installation, Inspection, and Documentation Requirements for Seismic Supports," was superseded on July 10, 1982, by WBN-QCP-4.23-2 through -9,procedure series. The above-mentioned attachments were part of WBN-QCP-4.23 and were superseded with the procedure. However, it appeared that the attachments were currently in use at the WBN site.) Prior to performing a final support inspection, the inspector contacted the craft foreman so that craftsmen would be available at the area while the inspector performed the inspection(s). The first inspection observed by NSRS was that of a hanger on which final inspection had been requested.

This particular request was for final support inspection of three hangers (supports) in the reactor building. Two of the three hangers had been inspected previously and had been rejected for wrong location. The supports had been reworked and were resubmitted for inspection on a "pending Field Change Request (FCR)." On these two supports the inspector checked thread engagement of anchors, length of tube steel, proper hanger device, spacing between washers on ends of devices, proper type washers, mininum distance between embedded anchors, size of plate, and weld quality. The weld quality examination consisted of a final visual inspection only, but the inspector did check the welds with a fillet gauge. The inspector noted to the reviewer that the tube steel had been welded on all four sides whereas the drawing (a part of the pending FCR) only required weld on two sides. The inspector stated that this was acceptable in accordance with the 47A050 (typical pipe hanger drawing notes) notes if the added weld was good quality. The only discrepancy

noted by the inspector on these two supports was that the washer spacing (distance between centers of the washers) on one set of washers exceeded the criteria. The inspector informed the craftsman of this discrepancy and the craftsman corrected the problem and the support was accepted in accordance with procedures with no IRN being written. After completion of the inspection of these two supports, the inspector tied each hanger with tape to indicate that they could be painted.

With the exception of checking thread engagement (support was welded to an embedded plate) of anchors, the inspector checked the third support for the same things he had inspected on the first two supports. When checking weld quality the inspector had the craftsman brush the weld to remove some paint. Two discrepancies, undersized weld and arc strike, were noted by the inspector on the third hanger. The inspector informed the craftsman of these problems and left the area. The NSRS reviewer asked the inspector if he was going to write an IRN on this support and the inspector stated that he would not. He did indicate that he would record the reasons for rejecting the support in the "Comments" column on the inspection sign-up log and that the craft would have to sign the log again to have the support reinspected. In accordance with the IRN procedure (WBNP-QCI-1.02-1) the problem should have been documented on an IRN as an unacceptable condition.

On a second inspection, involving hangers on a control air line, the following deficiencies were noted by an instrumentation inspector and were recorded on an IRN:

- Some welds had been painted and could not be inspected.
- One required hanger had not been installed.
- Two hangers on the air line had been welded to reactor building structural steel without an approved (or referenced) Variance.

The QC inspector appeared to be familiar with inspection requirements and acceptance criteria. He had with him the required document package and appropriate inspection tools. He displayed diligence in verifying hanger identification and attributes in near-inaccessible areas.

The third observed inspection involved two requested anchor-pull tests and a final acceptance of a hanger on a heating and ventilation system. The two assigned inspectors, both from the Hanger QC Unit, reviewed the document package, verified the status of previous inspections,

consulted Hanger Engineering for referenced information, and verified their test equipment was correctly calibrated. At the anchor-pull inspection location, it was determined that only four of six required bolt holes for each hanger baseplate had been drilled. The inspectors "cancelled" this inspection after consultation with the craft foreman, and an IRN was not written. In accordance with the IRN procedure, an IRN should have been initiated on the unacceptable condition. At the final acceptance hanger location, it was determined that one of the two baseplates of the wall-mounted hanger was oversized and not in conformance with Variance MA-55-81-63. The inspectors indicated this situation would require issuance of an IRN, documenting the condition.

Bellefonte

Hanger inspections were selected for observation at Bellefonte as at Watts Bar. Hanger inspectors normally worked in teams to reduce the chance of interpretation mistakes, for mutual assistance in making and checking measurements, and to simplify data recording. The Hanger QC Unit also required "peer review" of accepted inspections. Peer review was observed to be an internal audit process whereby a second team of experienced inspectors would re-inspect a percentage of recently accepted hangers inspected by other teams in the HQC Unit. In accordance with the site procedure controlling IRNs, hangers found deficient on peer review had to be documented on nonconformance reports. This practice was unique to BLN. NRC, in the 1982 BLN Construction Appraisal Team (CAT) Report, had criticized HQC for both high "peer review" rejection rates and apparent management tolerance of what NRC classified as an excessive rejection rate. NSRS review of current peer review reject rates indicated no substantial decrease through October 1983. However, substitution of the IRN program for the QCIR program may decrease the number of rejections due to interpretation of criteria problems.

NSRS observed both an HQC inspection team and a peer review (or audit) team. The inspection team inspected three hangers, one of which had been previously rejected for excessive gap between the baseplate and the wall to which it was mounted. This hanger was again rejected for the same condition with a new IRN. The unaccepted corrective action had been to attempt to apply grout (cement) around the gap. The other two hangers were accepted after appropriate verification of criteria.

The peer review team was assigned an ITT Grinnell sway strut, previously accepted by HQC for inspection. This support was determined by measurement and calculation to

exceed the allowable 4 degrees tolerance of the snubber angle with the centerline of the pipe by a factor of two.

NCR 2547 was later reported to have been initiated. This was later announced as the first peer review rejection since initiation of the new IRN procedure on November 1, 1983.

The inspectors observed by NSRS reviewers appeared to be familiar with inspection procedures and techniques and operated efficiently in teams. Inspectors were centrally located in the auxiliary building, quickly accessible to the crafts. Necessary reference material was maintained at the central work station.

VII. PERSONNEL CONTACTED

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McCurry, M. B.; Inspector, Instrumentation Quality Control Unit
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Vest, G. E.; Mechanical Quality Control Unit
Vowell, J. C.; Inspector, Mechanical Quality Control Unit
Wadewitz, G.; Project Manager
Weinbaum, J.; Supervisor, Materials Services Unit
Woody, C. M.; Inspector, Hanger Quality Control Unit

VIII. DOCUMENTS REVIEWED

WBNP-QCI 1.37, R7, "Quality Assurance Organization - Watts Bar Nuclear Plant"

WBNP-QCI 1.11-1, "Indoctrination and Training Program"

WBNP-QCI 1.11-2, "Qualification/Certification of Construction QC Inspector"

WBNP-QCI 1.11-3, "Qualification Program for Engineering Functions"

WBNP-QCI 1.11-4, "Craft Qualification/Certification Program"

QAPP 6, Revision 3, "Document Control"

QAPP 10, Revision 2, "Inspection"

QAPP 17, Revision 2, "QA Records"

Quality Engineering Staff Manual

CONST Quality Assurance Indoctrination Training and Qualification Program Manual

BNP-QCP-10.29, R5, "Quality Assurance Training Program - Bellefonte Nuclear Plant"

BNP-QCP-10.30, R4, "Craft Quality Assurance Training - Bellefonte Nuclear Plant"

BNP-QCP-3.7, R6, "Electrical Hangers"

BNP-QCP-3.9, R5, "Electrical and Instrumentation Panels, Boards, and Equipment"

WBNP-QCP-1.14, R13, "Inspection and Testing of Bolt Anchors Set in Hardended Concrete and Control of Attachments to Embedded Features," (Addendums 1 and 2), April 4, 1983

WBNP-QCP-4.13-VTC, R0, "Final Visual Weld Examination," (Addendum 1) May 16, 1983

WBNP-QCP-4.23-3, R1, "Support Location and Orientation," August 18, 1983

WBNP-QCP-4.23-4, R1, "Support Visual Examination of Weld Joints," May 16, 1983

WBNP-QCP-4.23-5, R3, "Support Shock Suppressors," August 18, 1983

WBNP-QCP-4.23-6, R2, "Support Springs," August 18, 1983

WBNP-QCP-4.23-7, R1, "Support Lubrication," August 18, 1983

WBNP-QCP-4.23-8, R3, "Support Final Inspection," August 18, 1983

WBNP-QCI-1.02-1, R5, "Inspection Rejection Notices," April 20, 1983

Memorandum from A. W. Rogers to P. E. Orstadt dated September 22, 1983, "Engineering/Quality Control and Quality Manager Organization"

BNP-QCP-6.17, R6, "Seismic Support Installation and Inspection, October 17, 1983

BNP-QCP-10.43, R0, "Inspection Rejection Notice," (Addendum 1), November 1, 1983

Memorandum from H. N. Culver to W. F. Willis dated July 19, 1983, "Response to Board Comment," (GNS 830719 052)

Memorandum from H. N. Culver to W. F. Willis dated August 9, 1983, "Response to Board Comment," (GNS 830809 053)

Memorandum from J. T. Barnes to P. E. Orstadt dated September 27, 1983, "Benefits of Engineering-Quality Control Split"

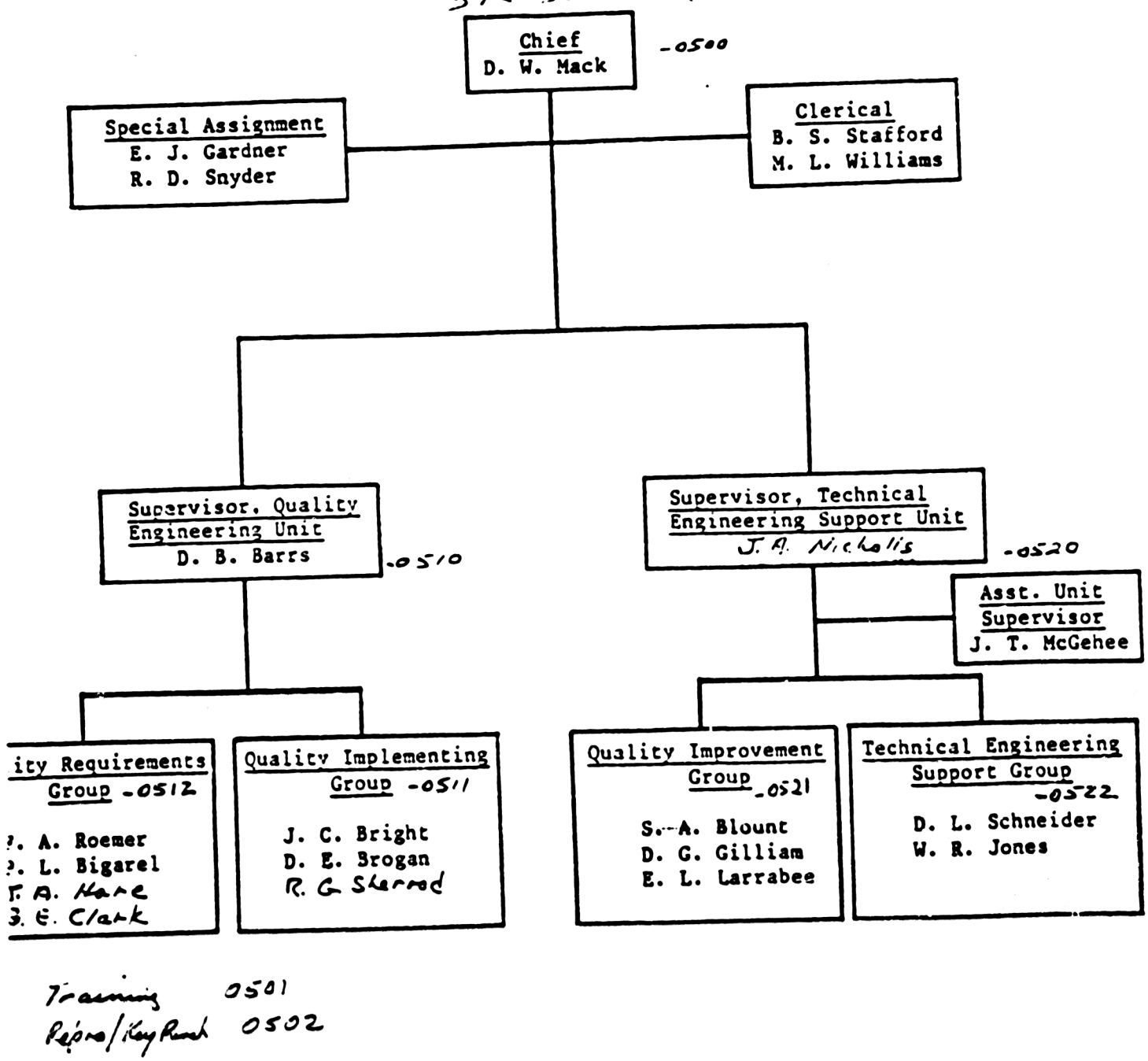
Memorandum from R. M. Hodges to L. S. Cox dated November 25, 1983, "BLN Nonconformance Report No. 1888"

ATTACHMENT 1

Attachment to Memorandum from H. H. Hull to Those Listed dated 11-19-82

CONST QUALITY ENGINEERING AND SUPPORT STAFF

592-35-XXXX



Training 0501
Repro/Key Punch 0502